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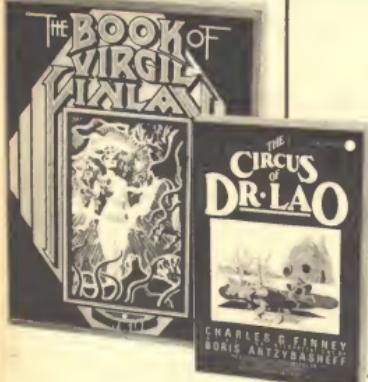
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Editorial

Nuclear Hypocrisy



Credit: UPI

"You cannot teach a man anything, you can only help him find it for himself."

—GALILEO GALILEI

IF THE SAME arguments used against nuclear power were also applied to the use of oil, gas, coal, and hydroelectric power the world would probably have to revert back to the lifestyle endured by Galileo and his contemporaries.

The current vogue seems to be to predicate the worst possible disaster at a nuclear power plant and then assume it will occur with the frequency of weather changes in New England.

Fear instead of reason is the call to arms.

Since the first nuclear power plant was built in 1957 the number has grown to sixty-two, with seventy-four presently under construction and more than a hundred in various stages of planning in the United States alone. In the last 19 years of nuclear energy production no one has died as a result of a nuclear power plant accident. It is a safety record other power industries would be proud to have.

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Yet anti-nuclear lobbyists (Nader's Raiders, the Union of Concerned Scientists, Friends of the Earth, the National Resource Defense Fund, etc.) would halt the construction of nuclear plants, close existing facilities and send the plans back to the draftsmen.

Their expressed concern is the safety of nuclear power and the possibility of minor or major accidents. "Nuclear disaster" is the catchphrase.

Nuclear hypocrisy might be a better one.

Despite the energy crisis, rising fuel and power costs and a diminishing supply of natural resources needed to supply power, we, as a nation, use more power each year. Very few are willing to give up their luxuries and, in fact, consider most of them necessities.

When we pick up an electric toothbrush, does it occur to us that 260 coal miners died in 1970 (not including Black Lung deaths)? When we use an electric hair styler do we whisper a prayer for the 134 roughnecks who died to provide us with oil and natural gas? When we turn on the television do we shiver at the thought of the 1,150 persons—a number of them electric

company linemen—who were electrocuted last year? Is there an organization called People Against Power (PAP)?

Last year 55,511 Americans died in motor vehicle accidents, 7,152 unlucky souls drowned, 6,503 burnt to death and 16,506 went to the grave as a result of accidental falls. In all, 115,821 died in one form of accident or another.

Those statistics don't stop many from riding in automobiles, nor do people stay in bed all day, every day, from fear of taking a fatal fall.

No death, especially accidental death, is acceptable. There is no occupation or recreation which couldn't benefit from stricter safety standards, nuclear power included.

But it is foolish to think even the strictest of safety standards will eliminate accidental death altogether.

This does not mean to say we should not seek the best possible safety standards for nuclear reactors. Clearly we should and we should apply those same standards to all forms of power production.

It is not our purpose to say nuclear power is absolutely safe. Nothing is

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Editorial

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Top row: Glen Bever and Diane Ackerman. Bottom row: Cynthia Felice, Pestor Butinsky, and Arthur Jean Cox.

Pro-File



Credit: photo by Linda Salzman Segan

Hal Clement, author of the classic novel, *Needle* and the highly acclaimed *Mission of Gravity*, is featured in this issue of *Galileo* with a fact article on nuclear power. A B-24 pilot in World War II, Mr. Clement was recalled to duty in the 1950's and served as an instructor at the Armed Forces Special Weapons School in New Mexico where, among other subjects, classified courses in the field of nuclear weaponry were taught. Needless to say, he is familiar with the issue of nuclear power and, in fact, carries about a slug of Uranium 238 in his pocket which is perfectly safe even though it makes a Geiger counter cluck like a barnyard full of chickens. He's *that* sure about its safety. Presently a teacher of Chemistry and Astronomy at Milton Academy (Mass.) he is married and has three children. In between classes, membership in the American Association for the Advancement of Science, the Meteorological Society, and the New England Science Fiction Association, he still finds time to paint and write and is currently working on a sequel to *Needle* for Ballantine.

Big Bear Lake, California is where **Alan Dean Foster** makes his home

with wife JoAnn, two cats, fifty talkative plants and a chair that was a wizard in its former existence. A penchant for steaks keeps Alan busy at the typewriter and has resulted in several novels (*The Tar-Aiyim Krang, Icerigger, Midworld*, etc.), the novelization of a number of films, the *Star Trek Log* series, talking records, radio plays and screenplays. His short stories have been published in *Analog, If, Galaxy, Fantasy & Science Fiction, Adam, Alfred Hitchcock's Mystery Magazine*, and several original anthologies. The New York City native spent most of his life in the Los Angeles area and received a BA in Political Science and Masters of Fine Arts from UCLA.

Jacqueline Lichtenberg is not a short story writer (even her letters usually run two to three pages) thus *Recompense* in this issue might be considered a maverick. A long-time SF fan (Marion Zimmer Bradley is her favorite writer), Jacqueline burst upon the professional scene with *Star Trek Lives*, a collaboration with Sondra Marshall and Joan Winston. Since then she has published *House of Zeor*, the first of her Sime series, which is soon to be a paperback. Her next novel, *Unto Zeor, For-*

ever, Doubleday, is scheduled for release in 1978. The Sime series has already resulted in a fanzine, *Ambrov Zeor*, giving an indication of its popularity. Possessing a BS in Chemistry, Jacqueline says she comes up with most of her story ideas while soaking in a hot tub. She makes her home in Monsey, New York.

All of **Glen Bever's** previous stories have appeared in *Analog* where he undoubtedly put his MA in Chemistry to use. After spending some time trying to synthesize anti-cancer chemicals on a National Science Foundation grant and changing filters in a high-volume air filter downwind from a smelting plant, Glen went to teaching Physics and Space Sciences in Peru, Indiana, where he now lives with his wife, three children and assorted invertebrates. Other than Science Fiction, his hobbies include chess and astrophotography.

Cynthia Felice somehow finds time from her duties as mother (two children), motel manager, part-time student, and assorted hobbies to write Science Fiction. Though she has stories scheduled to appear in *Universe 8* (Dec. 1977) and *Millennial Women* (Dell 19??) and has attended Clarion, this

marks her first story to appear in print. Born in Chicago, Cynthia attended North Park College, and is presently studying at both El Paso Community College and the Univ. of Colorado, Colorado Springs. She has worked as a veterinarian's assistant, secretary, copy writer, office manager, and sales engineer. Mountaineering, reading, horseback riding, singing, hunting, and training dogs are included in her repertoire.

Diane Ackerman has the unusual circumstance of appearing as a character in *Gala* (Harper & Row, Fall 1976) by Paul West, but in real life she is presently completing PhD work in English Literature at Cornell. *Saturn* is from *The Planets: A Cosmic Pastoral* (Morrow, Oct. 1976) and was written while participating in a program on Science, Technology and Society at Cornell, with Astrophysicist Carl Sagan as an advisor. Her work has appeared in *Paris Review*, *Chelsea, Carolina Quarterly*, *Massachusetts Review*, etc. and she is a 1977 recipient of a National Endowment for the Arts Fellowship. When not writing or studying Diane spends time scuba diving, horseback riding, or hooking ryegrass in biological patterns.

Arthur Jean Cox says despite his youth, he has been a familiar figure about the edges of the Science Fiction world for something like 30 years. He has published one book (but was secretive about the title) and has had stories and articles published in diverse markets, the latest being in *Science Fiction Discoveries*, edited by Carol and Frederick Pohl. A resident of Hollywood, Arthur says his only connection with the movies is the purchase of an occasional ticket. He is currently working on two books, is planning several others and hopes to do more short stories in the near future.

Robert H. Davis was born in Brownsville, Nebraska in 1869 of missionary parents. He grew up in Nevada and by age nineteen he was working as a compositor on the *San Francisco Daily Chronicle*. At 25 Davis was a reporter and moved on to New York City where he worked as a feature writer for such papers as Pulitzer's *Morning World* and Hearst's *New York Journal*. Frank Munsey hired Davis in 1905 as editor for his paper, the *New York Sunday News*. Shortly after hiring Davis, Munsey folded the paper and shifted Davis to the Editorship of *Munsey's Magazine*. Davis eventually edited and oversaw the publication of many more Munsey

publications (e.g. *Scrap Book*, *The Ocean*, *The Cavalier*, *All-Story Magazine* and *The Argosy*). Under Davis, Pulp magazine fiction saw some of its finest hours.

Perley Poore Sheehan was born in Cincinnati, Ohio in 1875. He worked on a local paper after High School and in 1896 Sheehan went to work for the *New York Mail* and the *New York Evening World*. By 1902 he was a staff reporter for the Paris edition of the *New York Herald*. In 1905 he became its managing editor, before being hired by Robert H. Davis as a fiction editor for *Munsey's Magazine*. Within three years Sheehan was associate editor with Davis of all the Munsey magazines, which he left in 1910 to devote himself to writing on a full-time basis. His first novel *The Seer* was published in 1912. In 1915 *The Argosy* published his most noted Fantasy novel *The Abyss of Wonders*. In 1922 Sheehan was in Hollywood to witness the filming of his novel *If You Believe It, It's So* by Paramount Pictures. He stayed in Hollywood as a screen-writer where his first job was adapting Victor Hugo's *The Hunchback of Notre Dame* and overseeing its production by Universal Pictures.

Six scientists, concerned that accurate information be disseminated about available forms of energy, combined their talents under the auspices of the Energy Research Group to write, *The Nuclear Debate: A Call to Reason* - 2. Ian Forbes is a former member of the Union of Concerned Scientists and is the former Chairman of the Nuclear Engineering Department of the Univ. of Lowell. Marc W. Goldsmith is a former consultant to the New England Coalition on Nuclear Pollution and past Chairman of the Northeast Section of the American Nuclear Society. Andrew C. Kadak is a member of the American Nuclear Society, a former Senior Physicist at Combustion Engineering and is currently Manager of Nuclear Information for New England Power. James B. Muckerheide is an ERG staff member who formerly was with Boston Edison Company, NUS Corporation and Bechtel Corporation. Joe C. Turnage is director of ERG and is manager of the Technical Resources Group at Yankee Atomic Electric Company. And lastly, Gilbert J. Brown is an Assistant Professor at the Univ. of Lowell, a member of the American Nuclear Society and Sigma Xi.

Editorial cont.—from page 4
absolutely safe.

However, if the issue of nuclear power, particularly the safety of nuclear power, is to be discussed, it should be done so with all the facts and should not rely upon propaganda deliberately slanted so as to induce fear, any more than it should ignore the potential for disaster.

All comparisons of existing power facilities clearly show nuclear power to be as safe as any other form of power production and safer than most.

Even if the projected figures on serious nuclear power plant disasters— involving 1,000 to 3,000 deaths (e.g., *Loss Of Coolant Accidents—LOCA*)—are off by a power of ten, it would still mean only one accident would occur every 10,000 years for 100 reactors in operation. If the projected rate of disaster were off by a power of 100 it would still be a relatively safe margin of operation, especially in the light of fatalities caused by other power sources.

Those who argue the nuclear disaster theory of politics have obviously chosen to appeal to fear and ignorance rather than reason. In doing so, they have seriously compromised the legitimate arguments their position may have. The arguments have, to an alarming extent, substituted a form of emotional hysteria for reason and adopted a political stance which would give government a dictatorial power that is neither necessary nor desirable. In some cases, it would extend into the realm of research and the freedom to pursue knowledge. It is, in essence, a subtler version of the fear of progress that ruled the Inquisition and hamstrung Galileo and his contemporaries. That fear is no more justified now than it was then.

At this point in time this nation can not afford to cease the construction of nuclear power facilities. The efficient application of so-called "safe" forms of power (solar and fusion) will not be possible for another 20 to 50 years, maybe longer.

In the meantime, nuclear power is the only reasonable form of energy available to replace the decreasing supply of organic power sources.

Without question, our only choices are the use of nuclear power or a new version of the Dark Ages. Take your pick.

Dear Science Fiction Re

There is a new direction in the field of Science Fiction. The early period, the time of Gernsback, Burroughs and robots, gave way to the middle period of interstellar travel, Russell and Campbell. Now a new wave of authors, led by the most farsighted of the 'old timers' is taking Science Fiction into its young adulthood. Experimentation is now mixed creatively with the tested craftsmanship of the masters. The great work of the past is now the foundation of the future. The best is yet to come, and GALILEO is where you'll find it.

GALILEO, a new Science Fiction quarterly (destined to be monthly), will be available only through subscription and a few select bookshops around the country. This select distribution avoids the wasteful mass-marketing practices which caused the financial ruin of many a fine old magazine. GALILEO's cost, \$1.50, reflects the quality of our contents, design, illustration, and most importantly, writing. Each issue of GALILEO is a unique blend of exciting Science Fiction and controversial articles on the frontiers of science fact, plus reviews.

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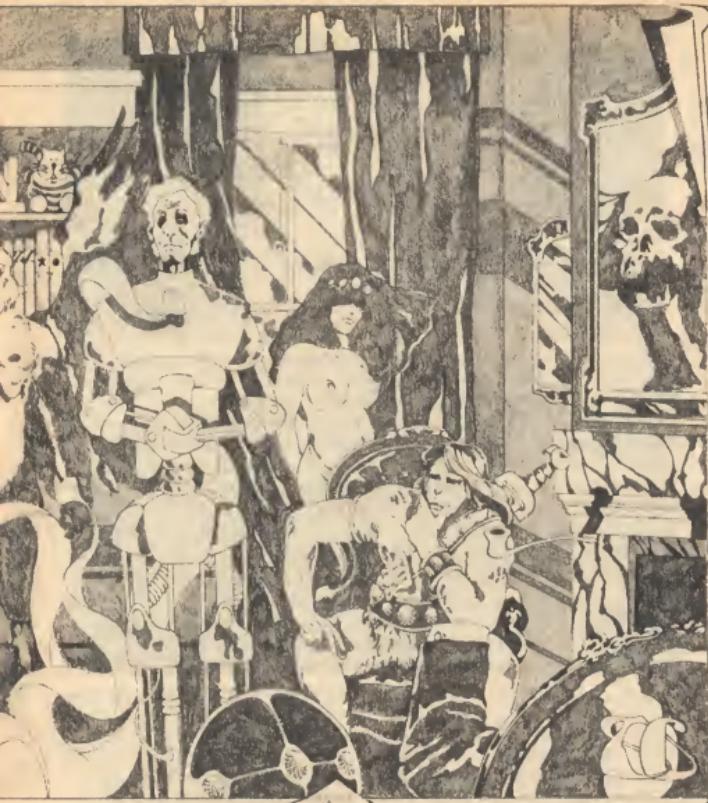
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Hal Clement

Atoms And Opinions



IT IS A SAD THING for a physical scientist to admit to a distrust in quantitative data. Physics never really got started until Kepler and Newton got mathematical with astronomical information, and chemistry remained alchemy until Boyle, Cavendish, and others began really to use the numbers provided by the balance. The most glaring anti-science opinions can commonly be recognized by the zeal with which they avoid quantitative measurement of pertinent factors, and mathematical analysis of the measurements themselves. Still, some figures have to be doubted.

An abundance of numbers has been dished out to the public by both the supporters and opponents of nuclear power. The trouble seems to be that practically all of them are extrapolations—that is, estimations of the way a graph curve will go, *outside* the area already plotted. Many people seem either to be unaware of this, or not to recognize how much caution must be used in weighing the implications of any extrapolated figure.

There is a widespread human tendency, which the development of sci-



Credit: William Turturro/Time

tific procedures has not yet completely neutralized, to form an opinion rather early in the process of argument and thereafter to weight facts according to how closely they agree with this opinion. I do not except myself, though I claim to be aware of the tendency and to try to fight it.

The numbers supplied in the nuclear argument differ so widely that anyone must admit some of them have been slanted, presumably by the foregoing bit of human psychology. People will differ, of course, in their judgement of just which of the figures have been affected. Because of this, I am going to do my best to avoid all the controversial numbers, while trying to persuade my readers to base their opinions on quantitative data as much as possible. This does not promise to be an easy task, and I don't expect to succeed completely.

The logical procedure seems to be: First, apologize to the people who went to a good deal of trouble to find all the numbers mentioned above for me, and assure them that the stuff was used even if it doesn't appear specifically anywhere below; second, to admit and evaluate my personal prejudices in

this question, so that readers can judge for themselves when I may be yielding to the temptation to slant my remarks; then, to consider item by item the need for a high energy technology and, as space may permit, the good and bad points of the possible ways we know of for supporting that technology.

Item one is done.

For item two, I have been a science fiction fan for over forty years, and since the early 1930's have tended to take for granted that atomic power was possible and would someday replace our obviously finite reserves of fossil fuel. Even in science fiction, we were quite aware of the possible dangers of the atom; atomic bombs were quite common, and I recall a story in which anti-atom sentiment had reached its present mob-action level and gone even farther, to the passage of laws against nuclear research. The story was called "The Rosselyn Experiment" and appeared, if I remember correctly, in the *Youth's Companion* magazine sometime in late 1929.

I took courses in physics in college and was quite familiar with radioactivity. I respected, and still respect, it as I do fire and electricity and explosives.

However, none of the four ordinarily cause me to panic.

I taught for over a year at the Armed Forces Special Weapons School in New Mexico, and saw one of the test blasts still being conducted in the 1950's.

I am still in favor of using nuclear power, at least for the next few decades.

The third item brings us onto more controversial ground; there are people who do not believe our high energy culture to be desirable. Reich's *Greening of America* expressed this viewpoint a few years ago. Eugene Rabinowitz described the book as "the most irresponsible he had ever read." Mr. Reich appeared to be unaware of the fact—I don't think this figure is controversial—that a hunting and gathering culture requires between two and three square miles to support a human being, on the average. Agriculture, of course, raises the possible population density. However, I doubt very seriously that *muscle powered* agriculture could possibly support the roughly a quarter billion human beings currently living north of the Panama Canal. With seven and a half million square miles to spread out on, this comes to some thirty to thirty-five people per square mile (check my arithmetic, by all means). The square miles though, include desert, tundra, swamp, mountain, and forest as well as the country which can be farmed with horse-drawn equipment and without powered irrigation.

It seems pretty clear to me that if we drop the high energy technology, most of us starve. I personally would not want the responsibility of selecting the ones to live.

On a lower level, of course, is the standard of living. I spent many of my boyhood summers on a farm in Canada, and frankly prefer not to spend most of my time hoeing turnips. I like my solid-state pocket computer and the intellectual activity it aids. I prefer toilet paper made for the purpose to any of the numerous substitutes I have had to use in camping and on the farm. I enjoy the hundreds of books in my own library, and am very glad of the thousands more in the libraries of nearby towns and educational institutions. I doubt that I could have any of these things if I lived in a culture in which most of the available person-hours of labor had to be devoted to producing food.

I therefore regard the high energy

use as a necessity, not just a luxury, though I certainly admit there is much energy waste in our culture which can and should be cut down.

Stop here if you don't agree with this. There are people who agree with Reich; there are people who know he is quantitatively wrong but have convinced themselves that they will be among the survivors; there are idealists who don't care if they are among the survivors as long as humanity gets back to "Nature." All of these are presumably against nuclear power (or any other power) and nothing in the rest of this article will change their attitudes. If you are one of these, turn to the fiction in this magazine; you'll enjoy it more.

If you are willing to concede, even if only for intellectual discussion, the need for large energy sources, let's go on and be specific.

If you doubt the accuracy of my statements up to now, either qualitatively or quantitatively, by all means take time out to check; there are lots of available references under the anthropology, ethnology, agriculture, and engineering headings in any good library. Don't confine yourself to my sources, and don't throw this article away until you've finished.

HISTORICALLY, man's source of energy other than muscles has been motion. Originally it was the ordered motion of large masses of substance, either water or air. This was converted to useful form by more or less sophisticated turbines, originally called water wheels and windmills.

Fairly recently, man learned to use the random motion of particles called heat. This started the Industrial Revolution, a rapid rise in the *average* standard of living, and the appalling rise in the slope of the population curve in the last couple of centuries. A factor which should not be overlooked is the enormous investment of resources in *portable* heat engines and facilities for distributing the fuel they use. Any solution of the energy problem which fails to make use of this investment will be at a certain disadvantage. For example, if the solution forces us to replace all our gasoline and Diesel engines with electric motors, not only will the engines and our facilities for manufacturing them be wasted, but also our extensive equipment for transporting liq-

uid and gaseous fuels. This may not seem serious at first glance—after all, the development of the automobile caused the "wasting" of horse-transport facilities—but remember that in the present case *waste* implies the need for replacement. This could prove not merely expensive but impracticable.

Still more recently, man has learned to use the motion energy of the more subtle entities called electrons; but to get the electrons moving he still uses the motion of wind and water or the heat engines which he already owns. Here again we have invested in a very extensive transportation system for this type of energy—the national electric power network—and have strong motivation to continue to use energy in electrical form, regardless of the prime source we may finally have to use.

The question of energy *sources* seems to cause a little confusion. Strictly speaking, our only sources are the sun, nuclear power, tides, and geothermal energy. Fossil fuels merely represent solar energy intercepted and stored by living organisms in past ages, while wind and water power are more briefly stored trickles from the sun. The tides and geothermal power are energies left over from the time of Earth's origin; the former actually represent the planet's rotation energy, and use of this source gradually lengthens the day, while the other is heat presumably from the coalescence of the particles which made up our world. Both, in other words, are motion energy again. Both are available in gigantic quantities, as far as actual amount is concerned; the difficulties of using them are another matter.

People sometimes talk of making synthetic gasoline, or going on a "hydrogen economy." Both may well prove practical as far as utilizing our existing equipment is concerned, but neither involves a prime source. Synthetic gasoline can indeed be made from carbon dioxide and water, but more energy must be put into this process than can be obtained afterward by burning the product. Similarly, the only practical source of hydrogen gas on this world is from the decomposition of water, and again more energy must be fed into this process than will be obtained from subsequent burning of the hydrogen. Both processes may indeed be used, after we solve the prime source problem, since they seem to represent fairly convenient methods

It seems pretty clear to me that if we drop the high energy technology most of us starve.

of carrying stored energy—fuel—to our millions of portable heat engines; but they are not answers to the basic difficulty.

The theoretically available sources can be divided into two major classes: permanent and interim. The first should not be taken literally, of course. Forever is a very long time. However, energy sources which appear likely to outlast the human species even if we don't blow or starve ourselves off the planet in the next few centuries are: direct solar power; indirect solar power—wind, burning vegetation, and falling water; geothermal power; and, if it can actually be accomplished in any environment other than the core of a star, hydrogen fusion (not the same as the "hydrogen economy" mentioned above, which merely burns liquid hydrogen as a chemical fuel, but a nuclear reaction).

Interim sources are, generally speaking, all we know how to use at the moment. They include burning fossil fuels, and fissioning heavy elements such as uranium and plutonium. The most we can hope from these is that they will carry our civilization long enough to let us solve the problems of using at

least one of the others to supply all our needs. This last qualification means that mere theoretical solutions are not enough; the business must be reduced to practical engineering. This is a point where a good many people who have expressed opinions on nuclear plants and other aspects of the overall problem seem to be a little weak.

The loudest argument these days happens to be about one of the interim sources, but it seems reasonable here to go through the good and bad points of the permanent ones first. We have to make some decision on which ones are most worth the effort of developing; then we can make some sort of guess at how long we will have to wait before they are usable, and we can stop depending on the interim sources.

To dispose of impractical ones first, water power is simply inadequate. It now produces only about six percent of our electricity, and a much smaller fraction of our total energy usage. Fully half the possible hydro resources of the country are already developed; even if we were to accept the capital expense and ecological problems of turning all possible streams into lakes, there just isn't enough. To the best of my knowledge, even the most ardent anti-nuclear people admit this.

Use of tidal power is practical, with present engineering, only in areas where the natural geography has been helpful. Building an installation where Nature has not provided either an unusually high amplitude—rise and fall distance—or an unusually rapid tidal current is a waste of resources, just as mining copper in Bingham Canyon would have been a century ago. The time might conceivably come when such extensive construction would pay off, but very definitely not while we are in our interim-fuel period. France and Russia both have tidal power units, but neither gets a very large fraction of its energy needs that way. The often-proposed Passamaquoddy project in our own country has been blocked so far by economic questions involved in transmitting its electricity to the nearest customers—not by a conspiracy of Big Business, which would be very willing to carry out the project if it promised to be profitable. If energy costs rise as those of copper did this situation could change, and we might put up with the greater power-line losses, but there is a limit here which I will discuss more fully a little farther on.

Putting generators in regions of permanent currents such as Gibraltar or the Gulf Stream looks nice on paper to the theorist but not to the engineer who has to do the building. Again, it may be worth it some day, but not in our interim-energy period.

There is a good deal of talk about wind power these days. Quantitatively there is plenty of it; practically, a given site almost never has a steady enough wind to keep an installation delivering rated power as much as half the time. The problem is one of capital outlay, as it so often is—and for those who think of capital as a dirty word, remember it is a measure of available effort and resources. I am sure we will be depending much more heavily on wind in the fairly near future; I am just as sure that it will not come close to providing even a tenth of our needs.

Burning wood or other vegetation has some promise. Somehow we would have to strike a balance between land needed for growing fuel and land needed for other purposes such as food production and living space (I suppose we might cut down on the latter by moving underground). The exact balance needed would depend on just what we were growing; but a plant which turned even two percent of the sun energy falling on it into usable fuel would be better than anything we have now. The biologists, of course, might come up with even better—given time. Personally, I think this line worth following up, though it is a very indirect usage of solar energy.

Hydrogen fusion is believed to be the reaction which powers most of the stars, including the sun. We think we understand the conditions needed for it to happen—gas densities of tens of grams per cubic centimeter and temperatures of tens of millions of degrees (on any scale you like, but I'm thinking in Celsius, which I still have a hard time not calling Centigrade). Since the temperatures are far above the boiling point of any known or reasonably imaginable substance, and the pressures far greater than would be provided by the Washington Monument supported on a Cuban heel, we are an unknowable distance from reducing this reaction to engineering practice. Optimists say ten or twenty years, as they have been saying since World War II. Pessimists are not sure it can be done at all. NO ONE unless it has already been done and not yet published, has a right to call his

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opinion better than an educated guess, either way. It may be our permanent solution; it is certainly worth major effort and expenditure; but DON'T use the possibility as a guide to how long we'll have to stay with our interim energy sources.

The heat energy inside the earth is not infinite and is in fact a good deal less in quantity than that available from the sun; but it would supply human civilization for very, very long time, if we could tap a significant fraction of it. The trouble is that the problem is not just drilling a hole, pouring water down, and getting steam back out to drive a turbine. The hole, in most parts of the planet, has to be extremely deep, and its lower end has to meet certain qualifications. Heat must flow to the receiving region as fast as we take it out; otherwise the rock simply cools down until more heat does flow in — and silicate rocks are very poor heat conductors.

There are areas already furnishing considerable power, and some of these have been used for decades. They offer engineering problems — the steam frequently has to have impurities like hydrofluoric acid separated from it before we let it at the turbine wheels or into the atmosphere, and like any heat engine one has to put up with the thermal pollution problem (did you really think that was just something from nuclear plants?).

At the moment, energy from inside the Earth is not *available* in anything like the necessary quantity, and making it so will demand a huge capital outlay. Once again, we would have to wait, using our interim sources, while this possibility was being developed. How long? Whose figures do you want to believe? Several decades at the absolute minimum.

Finally, there is direct solar energy. It has been used on a small scale for years. It cooks food, and heats houses, or at least cuts down on the bills for heating them in other ways (I'm from New England, or, more accurately, I'm still there). In principle, it can run our electric generators and synthesize liquid fuels — hydrocarbons or hydrogen — for our mobile power plants. It's great. I love it. I expect we'll depend on it entirely some day, if hydrogen fusion doesn't pan out.

It reaches Earth at a rate of a little under two horse-power — roughly three kilowatts — per square yard.

When, that is, it reaches the earth. The sun is not shining constantly; half the time at any one spot it is below the horizon, and during the other half it is often hidden by clouds. However, let's forget that. We will build our solar units in the Mojave Desert, and not worry about weather. Let's assume that we have sets of mirrors focussing the sunlight on great boilers which are feeding gigantic turbines which drive generators to make electricity for the country. Or let's suppose we are using solar cells, which turn sunlight directly into electric current. Either way, we get efficiencies of ten or twelve percent — let's say twelve, to keep the picture bright.

This country uses roughly two trillion — two million million — kilowatt-hours of electric power per year. Our solar power plant, at twelve percent efficiency, with the sun down half the time and averaging only halfway coverage the rest because the sun isn't directly overhead, need have a mere eight thousand square miles of receiver surface. Well, the Mojave Desert would be almost big enough, if environmental and ecological considerations should allow us to roof it over with solar units.

This, of course, merely supplies our present *electrical* demand. If you want to electrolyze water for hydrogen, or synthesize gasoline from water and carbon dioxide, you need a lot more. How much? I don't know. It depends on who's calculating the need for liquid fuel; but you get the picture.

Cost? Well, that we can guess. Edmund Scientific — that interesting corporation which so many high school science teachers like myself support as far as our school budgets will allow — sells a 30-watt solar panel for \$995. If we assume that mass production, technological improvements in the near future, and the well-known capacity of Big Government to get things for less than they cost us private individuals, all combine to reduce this cost by 90% — let's see. We're talking nine hundred million kilowatts while the sun is shining, with the fifty percent allowance for low altitude I mentioned before. That's thirty million panels at a hundred dollars a panel — only three billion dollars — not bad — a month's drinking alcohol. Of course, the panels have to be made, out of silicon purified to less than one part per billion contamination; and nothing

has been said about power lines — well, we have a pretty good supply of those — and the batteries needed to store surplus while the sun is up and keep juice in the lines when it isn't.

Well, we *could* build the system, in a few decades.

And that's my point. There are several lights at the end of the proverbial tunnel, in the form of power systems which could in principle last us indefinitely, if we stop breeding like hamsters and level off in our energy demands. However, we still have to get through the tunnel on our interim power systems — the ones we already know how to use, which means in effect the ones we are now using and their immediate research-and-development descendants.

THIS ARTICLE was supposed to be about just one of these systems, the nuclear power plant. I've been a long time getting to it. Anyone who can't see why, after reading this far, will probably not get much out of the rest. However, the whole question of what interim sources we will be forced to use depends on just how long it is to be until we can use the permanent ones, and just how long each of the interim ones can last us. These times, it should now be obvious, are matters of estimation rather than knowledge. I have tried to point out the sorts of information — not the specific figures, which appear to vary with the opinions of the preachers — which are needed to make these estimates; and I have suggested that you find these data from unprejudiced sources, if any exist. I have my opinion; I hope you come out sharing it, but I'd rather you sought your own specific figures rather than accuse me of slanting mine.

For the rest of this article, I'm going to assume that fifty years is the least possible time which could take us into the permanent-resource era. I think it's a ridiculously short estimate, but at least I'm not padding in favor of my own opinions (I think).

For that fifty years, fossil fuels and nuclear reactors will have to suffice. Opponents of the latter must hope that coal and oil alone can do it (there is no point in including natural gas; at present usage rates, coupled with the most optimistic estimate of new discoveries, it will be a natural curiosity before the twenty-first century).

STARSHIP TROOPERS

2156 A.D. and mankind comes face to face with an incredible, implacable enemy—the intelligent hive-spiders of Klendathu—the Bugs! Earth cities go up in smoke, and from Earth to Klendathu the battles rage, Bug warriors against the Starship Troopers!

This is the scene for Robert Heinlein's *Starship Troopers*, one of the all-time classics of Science Fiction—and now Avalon Hill has based a game on this classic story of conquest on alien worlds. The Starship Troopers strike from space with telepathic "Special Talents," nuclear weapons and power-suited soldiers against the subterranean hives and machines of the Bugs in Robert Heinlein's *STARSHIP TROOPERS*.

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STARSHIP TROOPERS recaptures the spirit and flair of the book, with each scenario recreating one of the battles that dot the way to the final climax—the invasion of Klendathu. All of the battles of the book are here, along with more battles that are only mentioned in the book—Raid on the Skinnies, Operation Bughouse, Sheol, Operation Royalty, and the Invasion of Klendathu, among others. The game uses programmed instruction to add weaponry and rules as the player moves from game to game—the Bugs appear, moving in their underground passages and suddenly erupting onto the surface to blast the human Mobile Infantry away, while the Mobile Infantry counter with increasing numbers of special weapons—spider gas, nuclear weapons, engineer teams with special demolitions, and better weaponry for the Mobile Infantry troopers themselves—and "Special Talents", humans with special ESP powers to seek and find the Bug colonies.

The unit counters represent individual Mobile Infantry troopers and small groups of Bugs, Skinnies (another alien race), and human engineers. Special weapons and technology are represented—heavy beam weapons, mobile missile launchers, sensors and retrieval boats are among the counters that must be dealt with. There are rules for gas attacks, radiation, underground tunnelling and extra-sensory perception. Victory Conditions change from scenario to scenario, varying with the orders given to the Starship Troopers—raids the wavering enemy Skinnies, or make a beachhead on a Bug world.

"Realistic" might not be the right word to use in describing a Science Fiction book and game, but *STARSHIP TROOPERS* has been carefully designed to recreate the scope and "feel" of the book. The colorful and picture-esque counters and mapboard are dramatic and pleasing to look at, and the rules have been designed to recapture the dramatic actions described in the book, whether landing from space or moving through the underground tunnels. In addition, the game extends and fills out the details of the conflict, adding weaponry and battles that are only hinted at in the book.

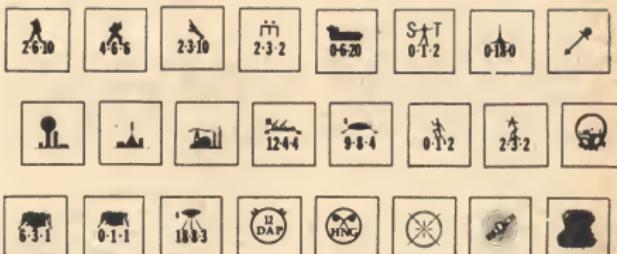
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Heinlein, voted the first "Grand Master" of Science Fiction, has done more than just lend his name to the game. After authenticating the work he wrote the introduction which adorns the game box itself. *STARSHIP TROOPERS* sells for \$10 plus the usual postage charges. Maryland residents add 4% state sales tax.



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tury).

Oil is borderline. There seems little doubt that enough for a century or two exists, provided the rest of the world doesn't try too hard to match our energy-consumption standard of living; but whether all of it is actually recoverable is another matter. There is a difference here between an energy source like oil and a construction material such as a metal.

A century ago, copper was cheap; nuggets of it could be picked up around the Great Lakes region. We had no qualms about using it as a fundamental prop for our culture, not that many people thought of it just that way then.

Now we mine, profitably, "ore" containing forty pounds or so of the metal per ton, and are glad to pay the time, the effort, and the energy needed to refine it. We need the stuff.

We started out the same way with oil and coal. We are getting into the same bind—our fuel deposits are getting to what might be called the Bingham Canyon stage; but we *cannot* pay the energy costs of retrieving fuels when those costs get close to the energy the fuels themselves can supply. This, remember, must include the cost of finding them. The claim that this cost is rising is not just Big Business propaganda; it's an obvious, predictable consequence of picking the apples within reach before getting a ladder. The rest of the apples are more expensive in *something*, and denying it is simple insanity.

We are definitely past the point where we need the ladder, as far as both oil and coal are concerned. Optimists do feel that oil will continue to pay its own way for a couple of centuries, and coal for even longer, provided we pay both the energy and environmental costs. The latter are pretty stiff, though.

For oil, we will have to fall back quite soon on oil shale, a sedimentary rock from which combustible hydrocarbons can be obtained. Like the copper ore, we will have to process a lot of rock for each barrel of usable produce—a processing which will take a good fraction of the resulting energy, and leave extensive piles of waste around the handling plants. Getting the shale itself will involve strip mining over large areas of country, as will recovering most of the coal.

Using these fuels will continue to

be expensive environmentally. The oxides of sulfur and nitrogen emitted by fossil-burning power plants are common knowledge; estimates of their cost in human life range from two to two hundred deaths per billion watts of plant per year (the lower figures do not come from the anti-nuclear people, who ordinarily fail to mention this matter at all).

It is chemically possible to remove the sulfur from both coal and oil, though the cost is another fairly large fraction of the energy available from each ton. This can cut the sulfur dioxide emission of a unit down to a fairly low value, though never to zero.

The oxides of nitrogen, however, do not come from the fuel; they are produced because we use air, some eighty percent nitrogen, to burn the fuel. To lower this emission, we can lower the temperature at which the fuel is burned, automatically lowering the efficiency of the power plant (see any physics book; this is a fundamental fact of thermodynamics, not a matter of engineering); or we can build enough liquid air separation plants to feed all our power units with pure oxygen. You figure the cost. In energy, please.

There is, of course, another way. We could trap all the exhaust gases from the plants before they went out the chimney, and remove the noxious components chemically—or isn't it fair to talk about the wastes from fossil fuel burners?

The arithmetical fact seems to be that the use of fossil fuel will continue to be expensive in health and life, as well as in the property damage resulting from stack emissions, unless we go to the same sort of fantastic precautions in handling both the fuels themselves and their reaction products as are being demanded for the nuclear fuels.

The latter, too have their dangers and limits. The amount of fuel grade uranium available is discouragingly small with present reactors, though breeders, which turn the ordinarily unusable Uranium-238 into fissionable plutonium, should stretch the reserves to a few centuries. The thermal pollution from a nuclear plant is about the same as from a coal burner, though the fact tends to be masked by the practice of dumping much of the waste heat out the same chimney as the chemical pollutants and forgetting

about it.

The material pollution from a nuclear unit of given wattage is far less than from its chemical-burning counterpart, whether measured in tons or lives, but this fact seems to be hidden very effectively in a constantly-generated cloud of misrepresentation. The main difference comes, fairly obviously, from the fact that the fires have to have smokestacks or the equivalent—the huge volume of gaseous exhaust has to be carried away or it will smother the fire. Removing pollutants before this is done is, as suggested above, not quite impossible but extremely expensive in terms of percentage of the plant's energy yield—and therefore automatically raises the percentage of thermal pollution. In the nuclear plant the "smoke" and "ashes" remain in the fuel pellets and need never be exposed to the environment. The bulk of the expressed terrors are concerned with abnormal operation—leakage, melt-down, sabotage, and the like.

I SHOULDN'T, BUT WILL. digress briefly to the fear of a plant's exploding like a nuclear bomb, expressed by some of the least informed critics. The fact is that it would be far more catastrophic and far more probable for the unmined coal lying under the state of Pennsylvania to explode all at once. There seems to be a wildly unrealistic idea loose about the ease of causing a bomb-type nuclear blast. Actually, if ten fifty-kiloton fission bombs were armed and placed in the same room, and one of them deliberately fired, the total yield would still be fifty kilotons—the other nine weapons would be destroyed before they could operate properly to contribute to the nuclear reaction significantly. Forget the mushroom cloud; it is irrelevant to power plant discussion.

While there are genuine dangers from a nuclear plant, they have been grossly amplified in the minds of many people by what I am not the first to call "radiation hysteria" (a better name would be "radioactivity hysteria," since "radiation" includes the stuff from the sun which so many people go to the beach to get, but trying to straighten out one misconception at a time is hard enough).

Yes, plutonium is produced—that's the whole idea; we need it for fuel.

Yes, plutonium is poisonous (though not the "deadliest poison in the world") and small amounts can cause cancer. There is not enough space in this article for a completely detailed list of all the substances which can cause cancer and are currently used extensively in necessary industry and transported around the country. Personally, I am both mystified and irritated by the fact that scare tactics work so well against nuclear plants and so poorly against cigarettes, which kill more people every four months than the most pessimistic total estimates I have seen of a core meltdown—the most dangerous thing that can happen to a fission reactor—coupled with enough simultaneous safety container and other breaks actually to release fission products to the environment. In fact, the estimates by Linus Pauling—certainly an opponent of bomb testing—for the deaths resulting from our *deliberate* release of fission products to the air back in the fifties, come to about three years' worth of automobile fatalities, or six months' cigarette kill. There is something funny about human psychology.

The risk of plutonium diversion by terrorist groups for nuclear blackmail seems also to be overrated, to me. It can no doubt happen, though the difficulties of transporting bomb quantities of the element without detection and its manufacture into a workable fission bomb don't seem to have received adequate thought; but it seems easier and more practical for the "liberation" groups to steal a few truck-loads of ordinary high explosive and blackmail the water supply instead of the structure of a city. (Don't jump on me for giving the punks this idea; the late Edgar Rice Burroughs beat me to it in the March 1941 issue of *Amazing Stories*.) In any case, it is hard to see how our failure to build breeder reactors will stop, or even greatly diminish, this risk. Countries which lack our coal option, such as Japan, are unlikely to hold off their nuclear construction. Furthermore, there are already countries with nuclear plants from whom anti-U.S. groups could probably get the stuff without the need of stealing it.

I have not, please note, *denied* any of these dangers. They exist. I do not belittle the three thousand deaths which might occur over the thirty or forty years following a worst-possible

reactor accident; I should hate to be either one of the victims or the friend or relative of one. But let us, please, retain some sort of perspective. There is no such thing as a perfectly safe energy source, and certainly there is no such thing with our present population, as a safe way to do without energy. The question is what we consider the risk to be worth, and what are our safest options.

The most important pertinent fact usually omitted from the terror tactics is that fission plants are inherently far safer than the fossil-fuel burners. To a person who is afraid of the radioactivity in a wrist watch or an ion-type smoke detector—yes, there are such people—it is the quality rather than the quantity of the danger which counts, and it is unlikely that reason (mere facts, after all) will get to that type of mind. I, however, would be happier if we could get through our interim-energy period on breeder reactors alone. Since it seems unlikely that we can, from the figures mentioned (no, not given; if you're going to vote, get your own figures from a source you can trust) above, I am willing to put up with the oxides of sulfur and nitrogen in the hope that my children, or at least my great-grandchildren, will still have an energy technology to live with when the final source problems are finally worked out and applied. I would like them to have at least the option of being artists, scholars, or builders instead of eighteen-hour-a-day dirt farmers. I don't belittle the noble profession of farming—I mean that adjective sincerely—but when done with a hand-hoe it leaves little time for the other human possibilities.

When you read other material on this subject, try to judge the writer. Don't go merely by his scientific credentials, since there are Nobel laureates and Ph.D.'s on both sides. Try to judge his bias (I hope I've been frank enough about mine) and, please, even if you're not a scientist yourself, try to get pertinent figures from whatever source you can find. There are many which are not directly concerned with the nuclear-versus-fossil fuel debate and may not be biased at least on that question. Read them, and do your own arithmetic. You may not get a final answer, but you may at least spot some of the cruder examples of misrepresentation.

If you do want ready-made opinions, of course, they are easy to find. Ralph Nader and his followers are ardently anti-nuclear, and their writings are easy to find. So is a group calling itself the Natural Resources Defense Council, Inc.; its address is 15 West 44th Street, New York 10036. It will gladly provide you with literature.

Pro-nuclear groups seem harder to come by, but there have been excellent articles in *Scientific American* magazine by David J. Rose of M.I.T. (January 1974) and by Hans Bethe (January 1976). The most balanced item I have read at all recently (yes, allow for my bias; it tends to agree with me) is *The Nuclear Debate: A Call to Reason* published by the Energy Research Group, 1661 Worcester Road, Framingham, MA 01701, which gives quite a range of figures at the points where estimates tend to differ. At least, it does give figures, if my ducking around them has irritated you.

I have not tried to find an answer to the energy problem; I am not sure that one can be found, though wishful thinking is as tempting to me as to anyone else. I am quite sure that a completely safe solution cannot be found. I have tried to organize the problem as I see it, into long-term and interim aspects (some people may feel that the breeder reactor is so far from perfection that it belongs farther in the future than I implied. I consider it likely to reach the application stage far sooner than solar energy; disagree with me if you like, after pertinent research).

And I have tried to dispose of what seems to me the biggest block in the road to a solution: mankind's tendency to ignore dangers merely because they are familiar, and worry about less well known *maybes*. Familiarity may not breed contempt, but it certainly seems to cause indifference; and even if we've outgrown our fears of ghosts and the evil eye, the less everyday aspects of science and technology seem to be taking their places.

I close with a statement which I consider to be factual, and which can be supported by the statistics of even the most ardent anti-nuclear preachers: Anyone who is more afraid of a nuclear power plant in his town than of a steering wheel in his hands, an alcoholic drink on his chair arm, or a cigarette in his mouth is seriously out of touch with reality.

AXWELL DAMEUS FENTON, III, drew himself to his full six feet and allowed his ample paunch to add to the dominance that was more than dignity. He took a deep breath as he eyed the Reservations Clerk and the Liner Captain and then pitched his voice low and spoke with a dangerously intense calm, "I will not, repeat *not*, under any circumstances share a cabin with a non-human. My stockholders would never stand for it. As humans, you should understand that."

"But, Mr. Fenton," the lean, grizzled Captain said, "I assure you our professional discretion is irreproachable."

"I'm certain it is. But you do carry other passengers."

Bolstering his confidence by brushing his fingers over the computer input controls on his gleaming counter, the clerk said, "Mr. Fenton, the Line deeply regrets your inconvenience and will go to any lengths to compensate you for losses due to the delay if you choose not to share with our previous passenger, but the law doesn't allow us to bump this passenger."

"The law! You know damned well *you* make the law on these forsaken transfer stations! And the entire worth of your Line couldn't cover the losses IDC will sustain if I don't get to Samonhauk on time! The economies of whole solar systems will rock to the blow."

"Sir," the Captain stepped around the counter with one professional hand outstretched, "won't you just come aboard and meet the other passenger. Right this way... It won't take but a moment."

Fenton allowed his caped arm to be cradled as the shorter man guided him, "Alright. If you people haven't the nerve, I'll go evict him myself!" He freed himself, brushed wrinkles from his impeccably tailored business suit, and marched beside the Captain out into the cavernous Round Room that was the central chamber of the hollow asteroid, over the teaming causeway and up the slideway to one of the higher ports.

The ship corridors were narrow, quiet, and amply supplied with railings, outviewscreens and the showcased artworks of various races, but the passengers they passed were all human. Eventually, they rounded a curve and entered the first class deck which differed from the rest of the accommodations only in allowing an extra nine cubic feet per passenger. The Presidential Suite boasted an extra twelve cubic feet.

The Captain brushed the signal plate set into the rectangular door and after a slight pause it clicked outward invitingly. The "suite" consisted of one large room with two chests-of-drawers and a table with two chairs. In the wall to their right, a door stood ajar revealing gleaming sanitary facilities.

The colors were neutral beiges and grays and there was no attempt at decoration lest some dignitary be offended. The dim lighting concealed whatever contrasts in tone and texture the designers had employed to relieve the monotony. Fenton observed, privately, that *bon voyage* gifts had a place in such a room and were conspicuously absent now.

As they entered, a gray drape swished aside on power-pulls, and at the same instant Fenton shivered in the chill, dry air that reeked of breadmold and knew who the Presidential Suite belonged to.

The Captain said, "Mr. Fenton, may I present Mr. Zepon Aamidtsurra. Mr. Aamidtsurra, may I present Mr. Fenton, the man who claims this cabin as I've explained."

Jacqueline Lichtenberg

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"The Aamidtsurraa Quadrant passes into High Season tomorrow, if my calculations are correct. The catacombs have been filling with first comers for days."



The Stilhzani reclining on the bed was living proof that the phyla of one planet can't be compared to those of another. The patches of feathery growths on the round, earless skull weren't avian. The neck frill, prominent incisors and scaly skin texture weren't reptilian. The slanted, glowing eyes with the paired, vertical pupil slits weren't feline. To sophisticated eyes, he was comfortably humanoid, though with twice as many joints to his limbs.

Fenton's eyes were more than sophisticated. They flicked from the motley, light green fuzz that should be blue to the shiny green skin that should be dull and met the glazed, listless red eyes set far apart in the all too human face. He didn't need the breadmold body odor to tell him the Stilhzani's condition was truly critical.

Zepon said, "Forgive that I not rise." His accent, while surprisingly intelligible, ignored Terran vowel-consonant distinctions with fine abandon.

As the shock wore off, Fenton knew what he had to do and he did it without hesitation. He touched the backs of his hands to his eyes and then swept them outward in the Stilhzani gesture that said, "I humbly beg permission to share your abode for a space of time short but definite."

Some of the glazed look faded as Zepon said, "Why would you believe I willing to share with a human?"

"I don't," said Fenton allowing the anger to rise in him, the same anger that had propelled him through a brilliant career ending prematurely as a colonel in the Federation Force of Order, the same anger that was now about to abbreviate his career in business. It was a cold anger that struck a paralyzing chill through the heart of all who encountered it. He said, "However, you obviously aren't going to make it without help."

He turned to the Captain, "Have the purser get me several changes of warmer clothing, then stow my baggage and get this glorified garbage scow moving... I'll no longer tolerate a moment's delay. Move!"

The Captain retreated hastily, not at all sure what had caused the sudden reversal but not inclined to question his good fortune.

Fenton closed the door and went to examine the thermostat set in the wall beside the door. He spun the scales until he found Fahrenheit and read sixty-five. He adjusted it to sixty-two, and then turned back to Zepon, his face a stone setting for implacable gray eyes, "I'll bet you haven't been out of that bed for days."

"Truth. But what do you know of it?"

"I know that it's twenty-two standard days to Stilhzza and that you're going to live through every last one of those days; you're going to hate me, . . . but you're going to live because I will not, repeat *not*, travel on the same ship with a corpse. Is that understood!"

Without waiting for acknowledgment, Fenton took the three strides to the other bed, flung his cloak onto it and rounded on the Stilhzani, "What I *want* to know is how you came to be here in this condition and why nobody has been helping you."

"And what would you know of, . . . 'this condition?'"

Approaching the recumbant figure with bitter determination, Fenton said, "I know enough. Now roll over." Warming one hand against the other palm, Fenton looked down into the now clear scarlet eyes with their paired, yellow pupils open to the dim lighting. He wasn't disturbed by the eyes. In fact, he was pleased to note they were now clearly

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focused on him. That was an encouraging sign.

Something in him melted and he leaned down to speak softly, "Listen Zepon, . . . I know enough to recognize incipient estivation when I see it. Now, it's going to be a long three weeks home for you and you just aren't going to make it if you don't get some attention." He laid a hand on the Stilhzani's shoulder carefully clear of the sensitive frill, "I know how to do this, . . . believe me . . . I won't hurt you. Now roll over."

Too enraptured to put up a fight, Zepon rolled over to expose his bare back to the human's touch. With a deft gentleness surprising in those large, blunt fingers, Fenton probed the lower back until he found the upper emission orifice. It was retracted and hard as stone. He laughed, "Relax. You're tense enough to start spewing your wrapping right now, and that would be both futile and fatal," he patted the barely distended abdomen briefly, "You haven't got what it takes yet."

For several minutes he crooned soothing words and massaged the orifice and the whole back while Zepon emitted hoarse groans and occasionally twitched away gasping. Finally, Fenton said, "There, that's better. Doesn't hurt so much now, does it?"

"Yes. You've done well. I believe I could actually sleep."

"Oh, now, none of that. Come on, roll over." When he had him on his back again he gripped both those hands with their seven long, four-jointed fingers and two opposable thumbs, "Here, I'll help you sit up."

"No. Let me rest."

"You're going to take a walk."

"I can't . . ."

"I know. But you're going to anyway." He hauled the limp body to a sitting position, swung the thin but powerful legs to the floor, "Now, stand up. I won't let go, I promise."

He draped Zepon's arm over his shoulders, settling both elbows comfortably and lifted him to his feet. The Stilhzani was easily as tall as Fenton, much thinner, but, Fenton, knew, ordinarily much stronger than any human.

For ten minutes, he walked Zepon around the room until the Stilhzani could manage some semblance of co-ordination. "O.K., that's enough for the first time." He deposited his charge on the bed and made him comfortable, "Wait right here and don't go to sleep."

Fenton went into the tiny washroom, found a cup, filled it and returned to shake the Stilhzani to wakefulness, "Here, drink this."

"What is it?"

"Just water."

"No. I couldn't . . . I'd— . . ." He made a little circular motion with his hand.

"I know, I'll get something." He drew him to a sitting position and handed him the cup, "Drink. I'll be right back." He rummaged around in the washroom a second time and came back with a large pan just in time to brace Zepon's head as the retching started. The water came up first, followed by great quantities of green mucus, until Fenton was wondering if the pan would be big enough. Then the heaving became drier and finally subsided.

"O.K., now you can take a little nap until the food arrives."

"Oh, please, no. I'll be sick again."

"Not this time. I think you got it all up. How long

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has it been since you've eaten?"

"I really don't know."

"Figures. I'll find out from the steward and order something appropriate. If you're not sure, though, you could try some more water..."

"No, thank you." Zepon slumped back, exhausted.

Fenton slipped out of the room quietly, blinking against the bright corridor lights and, inhaling the clean air gratefully, he followed the strands of coffee aroma to their steward's station.

TWENTY MINUTES LATER, he returned with a well stocked tray and shook Zepon awake. "You told them to leave you alone, so they did."

Managing to sit up without assistance, Zepon regarded his benefactor levelly, "I wonder how you learned all this..."

"Eat something, you'll feel better. Then we'll talk. For three weeks, we'll talk." Fenton settled the tray over Zepon's lap, "Well, are you going to eat or do I have to feed you?"

Zepon peeked under some of the bright covers, eyed Fenton and performed the frill rippling equivalent of a shrug, "I can try."

It took him half an hour to nibble at everything and eat about a third of a bowl of the soup. In the meantime the Chief Steward arrived with Fenton's luggage and several changes of heavier clothing.

When he finished stowing his belongings, Fenton heard the warning chime for the warp drive and sat down on his bunk to wait it out. "Here we go, Zepon. Can you hang onto that tray?"

"Yes. I'm feeling stronger for the moment."

Then the wrenching twist that was not a movement but a distortion surged through them. It was short and very mild since this was a modern passenger vessel boasting all the latest refinements. Afterwards, Fenton put the tray on the table and took a chair to Zepon's bed.

"Fine. Now, tell me, how the devil did you get yourself into this mess?"

"I'm most curious to know how you learned such skills. Are you, perhaps, a physician?"

"No. A friend taught me."

"I never adequately can repay you for your efforts."

"I'm not asking payment."

"The more pity that your efforts will be useless."

"My efforts are never, repeat *never*, useless."

"To survive this, it is necessary to have a strong desire to live. Obviously, I lack sufficient will."

"Why?"

Zepon's neck frill plastered itself against his shoulders clearly indicating this was a private matter. Fenton abandoned that tack knowing the Stilhzani attitude toward privacy.

"Alright. Your name is Zepon and you're of the Aamidtsurraa Quadrant. How did you get this 'suite'?"

"It's the only room aboard with sufficiently flexible environmental controls."

Fenton nodded, "Of course. And this was the only transport available. That's really all I need to know. A man in my position has the means of acquiring information."

Zepon looked again at this huge man with the so Jacqueline Lichtenberg

gentle hands and the so implacable will. "You are the President of the Intersystem Development Corporation?"

"Right. But call me Max."

"How is it a person of your position knows so much about Stilhzani?"

"I told you, I had a friend."

"Do you also know that if it gets much colder in here it may throw me into hibernation...or worse?"

"It's not that cold. You're just getting stiff. Come on. Time for your walk."

"No. I can't."

"On your feet." Fenton pushed his chair back and held out an arm. When Zepon didn't respond, he moved him bodily, but unprotesting onto rubbery legs. "For the next three weeks, you're not going to sleep more than four hours at a time, you're going to eat, and exercise and you're going to hate every minute of it...especially later, but I'm not going to let you wrap yourself up until you're safely home. Now that's my final word on the subject...understood?"

It was then that Zepon knew that he was going to live whether he liked it or not. And, being in no condition to care much, he didn't fight the idea. When Fenton helped him back to bed, Zepon fell into a deep sleep.

Satisfied, the human welcomed the opportunity to slip out to the dining room for a meal.

AWEEK PASSED under Fenton's severe regimen and Zepon seemed to be holding his own but in the second week, the lethargy returned and his protests, while feeble, became more frequent.

Fenton spent much of his time brooding over the mess he'd made of his life by adopting another Stilhzani. But he wasted no energy on regrets, preferring to plan a job hunting campaign while mentally calculating his cash assets.

Then, one day near the end of the week, Fenton roused his charge for a meal and afterwards had it abruptly returned to him. When he'd cleaned up the mess and pulled up a chair to sit beside the recumbent Stilhzani, Zepon said, "I'm sorry."

"There's no need to apologize. We've done well so far. We're going to make it." Fenton gauged Zepon's growing abdomen and body odor, "You're first quarter of your Quadrant, aren't you?"

Zepon's neck frill flushed violet in assent, "I've always been among the first to retire into estivation."

"Alright. So you can't eat any more. I can understand that. The Aamidtsurraa Quadrant passes into High Season tomorrow, if my calculations are correct. The catacombs have been filling with first comers for days. I don't dare lower the temperature in here any further. In fact, I should start raising it soon to avoid upsetting your natural rhythm more than necessary. You've been feeling the chill lately."

That last was such a flat statement of fact that Zepon half raised his head to train all four pupils on his benefactor. "You have lived on Stilhza. How else could you know so much?"

Fenton studied his fingernails meticulously, "I...ah...have an unusually high empathy rating."

Zepon allowed his head to fall back to the pillow. "That does explain-not how you learned so much about

Stilhza when most humans know-not that we exist, and care-not."

"I told you, I had a friend."

"Why are you doing this... for me?"

"Because it needs to be done."

"Why? What difference in your Totality that I exist or not?"

This gave Fenton pause. Why did it matter to him whether this insignificant individual called Zepon lived or died?

"Max." Zepon's soft voice called Fenton out of introspection, "Tell me about your friend."

Something in Zepon's tone, some gentle prodding or need pierced the cyst that had encased that memory for so many years, and like an abscess draining, the story spilled out of him.

"I'd just gotten an emergency field promotion to Lieutenant Colonel and command of a Post out by the Orion Wedge. I'd been promoted too far too fast and the responsibility was really more than I could handle. I was Earth born and about as segregationist as they come. You can imagine my reaction when Khela'an Aamidtsurraa introduced himself as my aide and proceeded to run the Post while I foundered about trying to become oriented."

"At the time, he was a Captain, but you know how much that means for a non-human. He was a twenty-year man and he had more experience in his seventh finger than I'd had in my entire life. And at that, he was still a young Stilhza.

"It took many bitter humiliations to knock some sense into me, but I finally realized which of us was the ranking officer and eventually we became fast friends. He made an officer-and-a-gentleman out of me as the Academy hadn't, and I owed him my life and my career many times over.

"Them one day, orders arrived saying there would be a delay in his hibernation leave. Oh, I sent in emergency pleas, all the usual paperwork, even sent some precedent smashing tunnelgrams to Hub Central. But you know how the Service is. It was a wretched three weeks later before transport arrived.

"I insisted on accompanying him home. We made it that time. I really don't know how. He was first quarter too.

"All in all, those were good years. He got me a promotion and I got him a promotion and by some miracle kept him on my staff everywhere I went. And, through the years, I learned about the difficulties Stilhza have away from their natural environment, and I even learned something of that natural environment.

"Then, one year, we didn't make it." Fenton sat on that bald statement for a long time and Zepon let him brood in silence. Finally, Fenton took a deep breath symbolic of the fresh determination that had come to him as grief receded, "So, I resigned my commission to do something to realign the structure of our society before it topples from being human heavy.

"It was really an accident that I fell into Intersystem Development, but I took the opportunity to find a way to enable other races to colonize as extensively as humanity has. Of all the races that are bound to their planets, the Stilhza are in the worst position. At least individuals

of other races can travel freely if they've the inclination. "The Stilhza have the inclination but it's too dangerous for the average person to consider. The Stilhza need help the most, and are a potentially profitable market. But it's been ten years, and our labs still haven't come up with anything commercial. Until now. Perhaps.

"I was on my way to an important conference on the matter when I found that my reservation had been picked up by someone else. I was too furious to even ask who or why. And when I met you, of course I had no choice but to help."

He was interrupted by the door chime. He pushed the release and walked toward the door. The steward stood at a crisp attention and, tight lipped, handed Fenton the tunnelgram. Fenton nodded and closed the door before he broke the computer's seal, skipped the salutation and read the words printed on the glossy:

As Chairman of this Board, it is my duty to inform you that there must be no scandal involving any official of this Corporation. I must remind you of the terms of your contract which was written with a view to your past preferences.

Respectfully,

Folding the sheet carefully, Fenton tucked it away among his things before resuming his seat.

"What was that?"

"Nothing important."

"Tunnelgrams are never unimportant."

"Just business."

"Expensive business."

Fenton nodded, "Yes, very. It's time for your walk." "So you want to save my life to compensate Khela'an's loss."

"You're a student of human psychology?"

Zepon copied Fenton's tone, "Humans have a monopoly on guilt?"

"Not guilt. Avarice."

Zepon's neck frill fluttered a question mark.

Fenton translated, "Greed. If I let you die so I could get to a conference, would any Stilhza ever deal with my company?"

"Probably. After a while. Not am I important."

"Every living soul is important. Enough procrastinating. On your feet."

As he allowed Fenton to haul him erect, Zepon said, "Why do you believe we have soul?"

"That's not for me to judge. It's enough you're alive."

The lethargy reclaimed Zepon and Fenton's answer echoed in his uncomprehending mind. As they neared the washroom on their third circuit, Zepon veered off saying, "Max, I think I'm going to be sick again."

Fenton helped him silently, sponged off his face and carried him back to the bed, knowing that from then on, he'd have a bed patient on his hands.

THE NEXT FIVE days passed in a long series of crises with Zepon's lucid moments becoming shorter and wider spaced. Between jobs, Fenton's mind kept returning to the 'gram that really said, "Move away from that Stilhza or you're fired."

With each passing hour, such a course became even more

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impossible as his minute by minute attendance was the only thing keeping Zepon from giving up. After all, IDC was only a job.

But, finally, when they were forty hours out of Stilhza, Fenton had to slip out to send a tunnelgram ahead. He stood at the counter, under the cold eye of the human clerk, and laboriously blocked in the Stilhzani characters he hadn't used for ten years, paid for it out of his own pocket, and hurried back to his charge, knowing what the clerk thought of him but not the slightest concerned.

When the door clicked open on the musty dimness he'd grown accustomed to, he knew at once that something was wrong. He'd been raising the temperature and humidity gradually for days, until the room was stuffy for him but frigid to the heat-starved Stilhzani. But now it seemed warmer than when he'd left even ignoring the cloying moldiness that permeated everything.

Swiftly, he checked the thermostat and turned it down a hair before he went to his charge. Zepon was curled with the small of his back to the wall and his head tucked between his arms at an angle impossible for a human. Fenton gasped, and let the shock of failure wash through him as it had ten years ago.

But ten years ago he'd been too late. This time, he knew Zepon had had no more than fifteen minutes to bond himself in place. He'd stopped breathing, but he hadn't yet begun to spew the gelatinous wrapping material that now fully distended his abdomen. There was still a good chance.

Carefully avoiding the sensitive neck frill, Fenton grasped the Stilhzani's shoulders and gently but insistently pulled him away from the wall. The transparent rope of connective tissue elongated until Fenton could see it hadn't hardened into the nearly indestructible anchor it would become. Then, it broke away from the wall with a wet smack and slowly retracted into the lower orifice.

The upper orifice had just begun to project itself as Fenton hauled the compacted body to the edge of the bed and laboriously unfolded the limbs to get him in position for artificial respiration. He stripped off his watch, set it on the bed, clambered astride the head, and, for the first time in years regretting his respectable paunch, he began the rhythmic pumping. Soon he was rewarded with a trickle of blue-green mucus that became a gushing flood and then Zepon was coughing and gasping.

Hastily, Fenton hauled him to his feet and slapped his face smartly until those glowing red eyes focused on him but without recognition. Zepon pulled away from the human, neck frill plastered down, blue with revulsion.

"It's Max Fenton, Zepon, try to remember. It's not time yet. We're still aboard ship."

Memory returned but anger grew, "By what right?" Shaking, he spat fiercely, "Get away from me, . . . human!"

Fenton retreated a few steps, "Now calm down, Zepon. I'm sorry I had to do that, but it's only a matter of hours to Stilhza. If you think what I did was bad, imagine what it would be like to wake up alone, . . . not a female within parsecs, . . . presuming of course you *could* wake up, . . . and if that isn't enough, remember the Line would have you removed and no court would call it murder."

Slowly, Fenton saw sense return to those blazing eyes and he urged the Stilhzani into a chair, "Now, just sit still, I'll fix the bed." He swung into the familiar routine of cleaning up a mess and, as he worked, he said, "It wasn't your

fault. Some defect in the thermostat caused the temperature to rise suddenly while I was out. . . . It wasn't much, but in your condition—"

Installed between clean sheets, Zepon said, "I'm sorry I was angry. I was confused."

"Forget it. I know how you felt."

Those eyes focused in a rare moment of complete lucidity. "But how do your people feel about what you're doing?"

"Oh, the human race disowned me years ago. Doesn't bother me."

"You may be a Corporation President, but you're still just an employee. You'll be fired."

Fenton noted how the anger-induced vitality improved Zepon's accent as well as his mental agility. "If you die, I'll certainly lose everything I've built these last ten years. But if you live, . . . maybe I can salvage something. It might improve my position vastly if I knew how you'd come to be in this predicament."

"I guess I owe you that much." Zepon's frill rose briefly in a gesture accepting the human into his innermost circle of friends and Fenton flowed with a warmth he hadn't known since Kheala'n had accepted him.

The Stilhzani drew a breath, coughed raggedly, and said, "A year ago, I got about two hundred of us together for an attempt to colonize Stovain VI, a planet out on the far frontier of the Federation."

"Strange I hadn't heard of it."

Zepon's neck frill fluttered annoyance, "I found private funds. I planned to establish a bretalon plantation. The planet was suitable, and since bretalon is one pharmaceutical that only grows on Stilhza and seems to respond only to Stilhzani hands, the market on that edge of the Federation is brisk."

"We found a location that seemed ideal. There was a large, active volcano whose lower skirts were riddled with delightful catacombs. The outside temperature wouldn't stabilize sufficiently, but the caves were well heated. So, we installed vents to tame the volcano, planted our crops and were very optimistic as the temperature rose through the season quite comfortably."

"Then, one night, the volcano blew up, . . . vents and all. In the end, I was the only survivor. I stayed at the Service's District Hospital until my . . . wife . . . died. I didn't really care whether they put me on this ship or not. I still don't really care whether I live or how I die."

Fenton whistled tunelessly between even, white teeth. He knew the deep attachment implied by Zepon's term, wife. Not a sex partner but a life partner. With estivation approaching, of course he'd lost the will to live. But this was a real break!

"Would you be willing to try that project again? This time with professional backing?"

"I have not will."

"Not now. But when you wake up—" Fenton was counting on the tremendous personality shifts so characteristic of the Stilhzani after their severe seasonal changes.

"I'm not going to live through this."

"Get that nonsense out of your head! I won't stand for it. We're only a few hours out of Stilhza. I've just 'grammed the Aamidst to expect you and I am not, repeat *not*, going to let you make a liar out of me!"

Continued on page 77

Diane Ackerman

SATURN

20 Earths could be bedded: stowaway
planets tucked neatly inside,
like sharks napping in an underwater cave.

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My sugardaddy bribes me
with a yellow-white brooch
(striped-enamel, diamond,
and ten glittery baguettes)
dangling in a black velvet box.

I stretch up for the honey-pale token, to pin it
on my blouse, over a heart lit like a jack-o-lantern.
But Saturn lumbers off
with its curio cloudbank,
sky-tethers the icy shoal
elsewhere, padding round
an orbit, just out of reach.

An elliptical blur creeps
into my field of vision, bellowing
light, as I wind the scope down
to such razory focus that Saturn
lies stunned in a hall of mirrors,
hog-tied by the cross-hairs, a little green at the pole.
Today lawnmowers stammered, Pekingeses yapped, trucks grumbled
through downshift arpeggios; but tonight,
risen in the botherless black,
Saturn's ball of lemon ice
looks so cool and reviving,
I track it like the Golden Fleece.

Millions of vest-pocket moons
hang together as rings
that loop round the planet
like a highway skirting the golden city.
Dusky bright, and godawful sheer,
they dog the equator (like Uranus's moons), never more than
two miles thick: a sprawling coral reef of tailless comets,
grinding one another
finer and finer, lolloping boulder
to dusty mote as, eddying
down through the crepiest ring,
they pour into a gassy draw.

A tiny moon's constant nagging
shoos the odd guest
from Cassini's Division,
an open airway between the rings.
Phobos-sized snowballs tidy it up:
sentinel, roughshod, and devout as gestapos. Wide-open,
the rings hustle tons of light (more even
than the planetmain), coming it
so strong in the winter sky
that Dione and Tethys
pale away, like streetwise cats
ambling into the night.

In a seaquarium big enough
Saturn would float! lighter
than rock, or water. I marvel
it even holds together:
hydrogen-clotted ice, frozen
methane and ammonia, all lathered to a gaudy slush,
like Jupiter a bit, only colder, which may be why
the weatherworks and the lazy
cloud-roll idle as they do,
and ammonia freezes out
as a yellow blizzard, snowing
deep into the planetball.

Saturn nods, an out-size natural
sponge, adrift in the galactic shallows;
but far beneath the haze, in a rocky core,
20 Earths could be bedded: stowaway
planets tucked neatly inside,
like sharks napping in an underwater cave. I see the heart
of an artichoke, I remember Goya's *Saturn Devouring His Son*.
We couldn't live here, I'm afraid,
will have to stud the moons
with our kiosks and rotundas, eyeing
from below that striped hammock
bellied across thin air.

A yearlong carnival, known as
Saturnalia, begins with ritual
carving of the rings, when mythic
figures hewn from snowballs— —
thousands of Minotaurs, Gorgons,

and Dilemmas, Atlases and Leviathans— —all swirl round
the Lord of Halcyon Days, making breezy sacrifice.

For, like Japanese sand-drawings
in an earlier epoch, moon—
carvings are meant to erode, be
dislimbed by the hobnob and bump
of the rings, till not a rack remains.

Saturnalia's a sport time, too,
when Jovian moon-surfers take to Saturn
(another leg of their endless cavort),
flying wildly round the rings' undulating
carpet, or croquet-thwacking debris

in Cassini's Division (always in danger of being thwacked themselves,
and hauled away by a moonlet-tugboat). Anytime, you'll see the usual
hawkers and parades, craftspeople, con-men,
homely souvenirs; but only early season,
before the crowds descend, can you watch
the ice-masons hard at work, or hear
the joyous *boopla's* of the ring-riders.

Entry, *Fodor's Guide to Saturn*:

"Best camera shots
from Iapetus or Phoebe
Avoid Titan (too cloudy).
The other sherbetty moons,

all smackdab in the ringplane, make Saturn appear
utterly ringless:

an agate bulb, with a tally line
summing mid-planet.

But, viewed from Iapetus,
Saturn swivels like a gyroscope,
its hatrim turned

up and down,
while the planetcore stands still.
Daytime, you see back
and darkside of the rings;
nighttime, the sunlit maw.

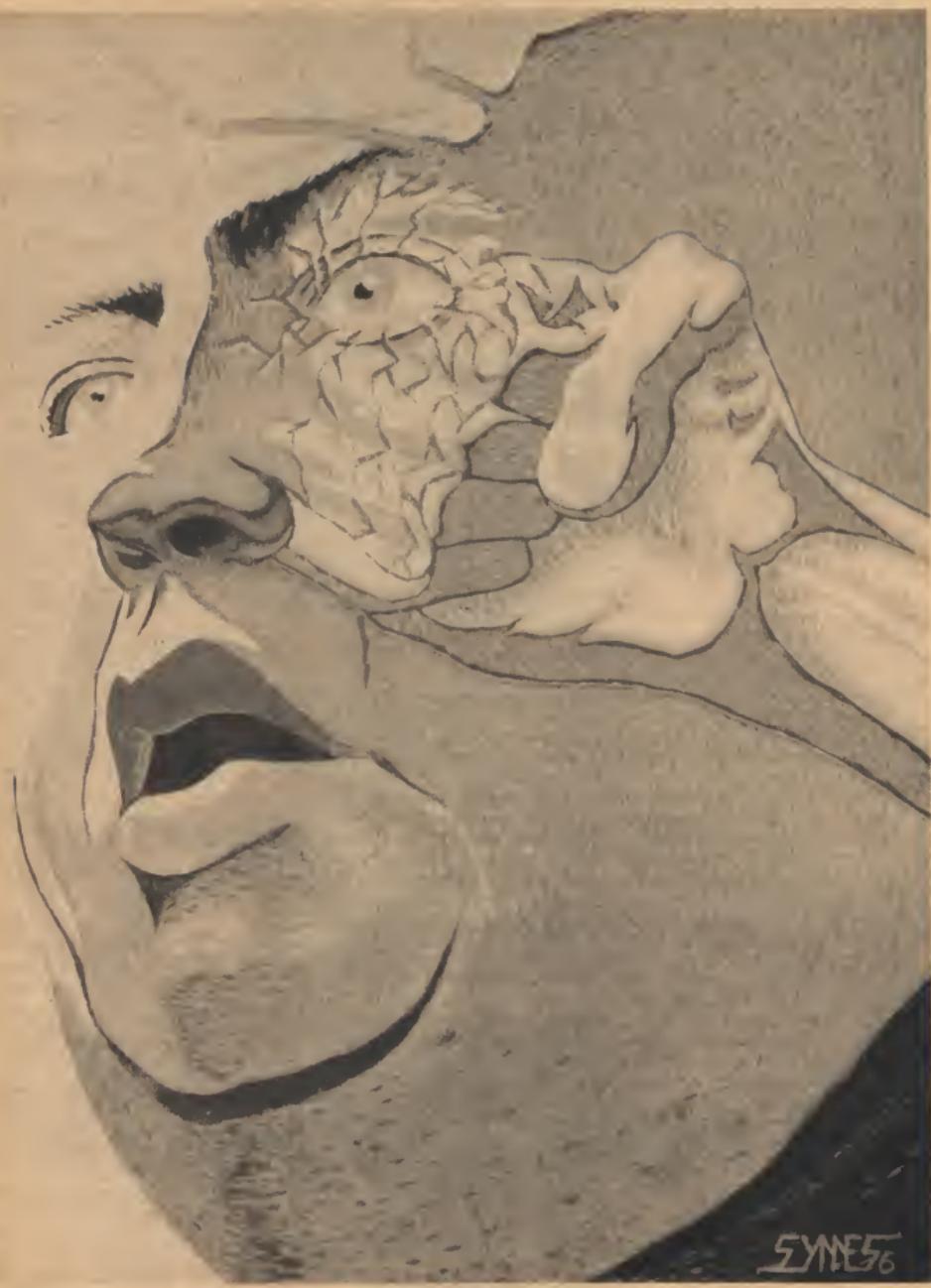
Only be sure to book a yurt on Planetview (the side facing
Saturn); on the other, glued always to deep space,
you could live out
a lifetime, never knowing
behind you lay
a lighthearted planet,
maizey in a halo of ice."

On Titan, warmed by a hydrogen blanket,
ice-ribbed volcanos jet ammonia
dredged out of a glacial heart. Liquid
and frozen assets uphold an empire
bigger than Mercury, and even a little
like primitive Earth: asphalt plains and hot mineral ponds. But
how I'd like to take the waters of Titan, under that fume-ridden sky,
where the land's blurred by cherry mist
and high above, like floating wombs,
clouds
tower and swarm, raining down primeval
bisque, while life waits in the wings.

Often I dwell on the Big Bang,
find my heart levied high, and the vision electric,
am wowed by that arch creativity.
When I tell people, they flinch
with terror, want no part of the ur-inferno,
will not truck with apocalypse. But Paul at the scope, one finger
on the clockdrive, tunes in the Universe with the affectionate
curiosity of a naturalist.
And I know, if I trigger the mental
clockdrive, his mind will gingerly
backtrack and zoom, run rings round
the spectral notion of Saturn.

I say, "*After the never-ending
gas cloud coalesced, the Universe
was all in one place,
and solid: a bard, local object
in an endless ether.*" He smiles,
says, "*Wonderful plot!*" "*In the beginning was the Word,
and the Word was a tough, silky ball of hydrogen.*"
He splits the double star, Albireo,
then pulls back a moment,
says, "Just imagine the commotion
of the Big Bang!" We huddle
in the breath-taking dark, and imagine.

Tonight, what with the moon
keeping so low a profile, the stars
are bright as campfires. Waltzed
around by how many planets? Drenched
in how many ground swells of life?
My saturnine ring-leader, pallid-footed, strolls along
with ten swanky moons in tow. And though I'm smitten now
with this giant manticore,
heartwise I know it's only
a panaching fancy: somewhere else
in the odds-on of space, evolution
may be minting a pipefish.



SYNEST

Arthur Jean Cox

A BLOW FOR UTOPIA

"Well, we've made some sort of miscalculation. It's not a non-violent society. They attack you in their living rooms. They do! You should see what I've been through this past month. A month? My God! To think, it's only been a few seconds of your time!"

WHEN JOHN TROLLOPE received his third black eye within a month, he decided to come home. "Something's gone wrong," he announced, struggling up from the chair he was sitting in, impatient of the wires and straps. "It's not a non-violent society!" He looked about at his co-workers—glared, rather, as if accusing them of something, and they, in turn, stared at him...for his left eye was darkening visibly, like a gathering thunder-cloud.

Moran, the medical man, leaned forward, peered. "There's definitely been an insult to the eye!"

"You bet there has," groaned Trollope. He added, hoarsely, "I'd like a drink."

If the others—there were five men: two in white smocks, two in business suits, one in shirt sleeves—if the others had not known him so well, they would have said that he was shaken. But John Trollope was never shaken. They followed him now, as always, as he lumbered into the nearby conference room and lowered his huge bulk into a chair beside the varnished oak table. "Get me a drink, will you, Dennis? The usual. That's a good boy."—these remarks being addressed to a youngish-looking, sandy-haired man, Ralph Dennis, the youngest of the Fellows at the Institute. He was a mere 32 years old and was habitually treated by the others, especially by Trollope, as an untried fledgling. He fetched the drink, a large scotch, from the portable bar. Trollope emptied the glass down his throat in two gulps, wiped his mouth, looked around.

"Well, we've made some sort of miscalculation. It's not a non-violent society. Yes, yes," shaking his large head to forestall any interruption, "there's not much crime in the streets anymore, but so what? They've merely moved the crime out of the streets into their homes. They attack you in their living rooms. They do! You should see what I've been through this past month. A month? My God!—to think, it's only been a few seconds of your time!"

He said all this for their benefit only, there being no newsmen or television cameras present: the Fellows had decided, after the Lake tragedy, that they could live without publicity for a while. And, besides, the newspaper accounts of the previous six Introjections—each based on a different Projection of some probable or possible future society—had all contained the most naive misrepresentations. The human subject, for instance, was invariably referred to as a "time-traveller," and it was said that he "took a trip into the future," and that he "came back" ...usually. And, as for television, that part of the process which could be shown on the screen was very unimpressive: A man is placed in a chair; he is wired to the Bierce-Bridge computer, on which the profile of the future society has been worked out; the computerized information is pulsed into his brain on the same frequency as his individual *mu*-rhythm (or Lake-rhythm, as it is sometimes called); he loses consciousness; a few seconds later he opens his eyes and tells of the world he has just visited. Naturally, the "trip" has taken place entirely in the traveller's skull...but, that being so, how, one wonders, does one explain Trollope's black eye? Or Arthur Lake's death?

Lake, the only begetter of the Institute for Future Research, was not actually the first man to "go forward." Young Ralph Dennis, the fledgling, was the first to be pushed from the nest. The projected world in his case was one of great material prosperity, but it had proved to have,

"There," was a projected future time, not far from now, in which the loosening of sexual bonds of the last few decades would have been carried forth to its logical conclusion.

he said, some surprising features. He added that he had liked the world—liked it so much that he had stayed six weeks before he decided to come home.

"Decided?" repeated Trollope, who had pushed the button that had broken the current and restored Dennis, after a little shaking, to consciousness. "Decided? Ha!"

But the kindly Lake, the Founder-Director of the Institute, didn't scoff. His grey head held very erect and looking very much the genius he undoubtedly was, he sat watching Dennis with a speculative interest. "Why did you come back, Ralph?"

Dennis glanced at Trollope, perhaps involuntarily, then looked down at the floor. "I had a reason."

Trollope's laugh was deafening. "You had a reason, all right—I punched the button."

Two weeks later, when the wires and straps were removed from Arthur Lake, that silvered head drooped forward, uncharacteristically bowed. The doctor pronounced his verdict; and in the hush which followed, Dennis's quiet voice was clearly heard in the room. "He decided not to come back. He stayed on and died there, perhaps of old age."

Lake's successor didn't laugh at that suggestion. He blustered in so overbearing a way about the "tastelessness" of the remark that the sheepish Dennis shrugged his shoulders and withdrew it.

But when John Trollope received his third black eye within a month, he, as he positively declared, decided to come home. "Because one thing is certain," he added, looking around, "and that is, that I am not—repeat: not—going to get a fourth."

30 GALILEO

"Can you beat it?" asked the returned traveller, "I also had a broken tooth"; and he touched a tooth at the front of his mouth, a tooth which was of course whole and unmarred. Those around him exchanged a look: astonished, speculative, amused. "Oh, you can't see anything now. They repaired it in nothing flat. Dentistry is really something then—you should see it." He stopped again. "Oh, hell, yes, I see what you mean...but it was all so real! I can't believe it didn't really happen."

Ferkin, who was Assistant Director, said, "If they repaired the tooth for you, they must still have some civilized instincts."

"Oh, they're kind enough in a way," admitted Trollope, twisting about in the chair a little. "They often apologize after they hit you. Nice of them, isn't it? Damn them! Just think: I've lived nearly sixty years in this society and have never been hit, not as an adult (except once, by a guy in a bar), but I was struck six times in just one month there."

"There" was a projected future time, not far from now, in which the loosening of sexual bonds of the last few decades would have been carried forward to its logical conclusion—that is, to a society in which there were no sexual repressions. This had been Trollope's pet project, his life-long dream. Not that he was all that much interested in sex—he wasn't. He was interested in violence. If you had a society with absolutely no sexual repression, there would be, he pointed out, no damming-up of instinctual energy and the release of it through other channels. There would be less frustration, more satisfaction with one's own life and therefore less violence. The streets would be safe again. Crimes of passion, revenge, jealousy, sadism, masochism, rape, child molestation and suicide—all these would cease or much abate. Those ominous groundswells towards war with some neighboring or distant state, the frightening appeal of demagogues, the pandering by the entertainment industry to a populace that could respond only to progressively ever-ruder forms of killing and brutality—all these would cease or much abate.

But something had gone wrong. Something was rotten somewhere in that Completely Unrepressed America of the year 2035:

"I wasn't there a week before I was hit the first time."

"But why?" persisted Ferkin. "If they're civilized at all, they must have had some reason for hitting you."

Trollope stared at him. "What do you mean by that?" A bristling outrage seemed to pull his heavy body upward to its feet. He loomed over the middle-aged Ferkin, trembling with wrath and frowning ferociously, ready to sink upon him and crush him. "What are you suggesting? Do you suppose I attacked them, knife in hand?"

Ferkin seemed to witt. "Well, I... I only meant—"

"I know what you meant," said Trollope, with a snort of disgust, his eyes searching Ferkin's face, . . . and, satisfied with what they found there, he surrendered his bulk grudgingly to gravity, allowed it to sink back into the chair. The others were silent, expressionless, with a congealed embarrassment and with shame for Ferkin. Trollope rolled his "insulted" eye about at them, slowly. His manner softened; the lightest shade of conciliation touched it. "I've always been very outspoken. You all know that. They didn't like it, that's all. They would invite me into their homes as a guest and then, when I became, you know, sort of heated in argu-

A BLOW FOR UTOPIA

ment—*wbam!* I'd get it right in the eye or the mouth." And he rocked his massive head back, as if from the impact of that imagined blow. His left eye was very black and red, like a botched painting of the sunset seen through high windows. "They're violent, I tell you. Pugnacious, combative, defensive—any word you want to use. There's a horrible rage lurking just below the surface of that society. What the source of it is I'm not quite sure, but my guess is that the sex talk up front is just for show. People in that time are supposed to be sexually unpressed and they all try to live up to that self-image, but it's just an ego-facade. They're really sexually unsatisfied."

"I wonder—" said Dennis.

"Don't wonder, Dennis. I was there; you weren't. Is that clock right? Five! It was one a.m. when I left there, a half hour ago. Look, I think I'll go home. I feel as if I've been away a year. I want you all to meet me here tomorrow at ten sharp and we'll try to thresh out this problem. We can go over the Projection again. There must have been something wrong there. You can drive me home, Dennis. I don't quite feel up to it."

TROLLOPE'S HOUSE was a sprawling near-mansion on a hillside, so thickly clustered about by trees that it was barely visible from the highway. Often, a motorist passing it at a law-abiding fifty-five miles an hour would look up and see the few dull windows looking out through the tops of trees, as if from concealment, and wisps of half-formed thoughts would stray across his mind—thoughts of Charles Manson, of gruesome family murders and bodies lying undiscovered for days—but of course he would pay no attention to such thoughts as those.

Ralph Dennis didn't have such flashing glimpses of morbidity as he spun his car up the winding dirt and gravel driveway, the ponderous Trollope beside him and the pebbles making an alarming machine gun clatter against the bottom of the car: perhaps because those associations had been replaced by more pleasant ones.

Trollope led the way inside, puffing up the steps like one too glad to be home; so glad, in fact, that he almost closed the door upon Dennis, who had been tagging along close behind him.

"Oh! . . . Yes, come on in, Dennis. You can have a cup of coffee before you go."

If Dennis was a trifle embarrassed by the manner of this invitation, he nevertheless went in and rather quickly too. It may have been that his host's eagerness to be inside had infected him. Anyway, he went in; and once inside he looked about with some interest, although he had been there more than once and had already seen the hallway leading to the dining room and kitchen, the famous sunken living room to the left (the scene of many informal think-sessions presided over by Trollope) and the spiral staircase to the right.

Trollope raised his voice. "Sally!" The name might have been heard on the highway a hundred yards below—"Sally! Where the hell are you?"

A pair of bare legs descended the winding stairway and a girl came into view, in sections: wearing sandals—white shorts—a blue-and-white striped tee-shirt—large tinted glasses. A rather pretty girl, really, in her late twenties, though somewhat short and with straggly, wispy blonde hair.

"Ahh," murmured Dennis, "the scientist's beautiful

daughter." There was no response, so he added, smiling but with a slight tremulousness: "The prettiest of the Trollops."

She allowed him half a smile for the audacity of that.

"Make us some coffee," ordered her father, shucking off his coat. "You don't seem very glad to see me."

She gave him a look of some surprise, . . . which held when she saw his face.

"Aren't you forgetting?" said Dennis. "You've only been gone from the house a few hours."

Trollope chuckled. "That's right, too. Okay, Sally, you don't have to be glad to see me. Never mind the black eye. I got it in the line of duty. Where's that coffee?"

She turned towards the kitchen and the two men descended the steps into the living room. "Have a seat, Dennis. Forgive me if I just . . . plop." And he made good that last word by falling into the complementary form of his favorite easy chair, a misshapen brown leather monstrosity. "I never tell her about my work," he added after a while. "She wouldn't be interested."

"She . . . just stays here alone during the day?"

"Yes. Helpless and unprotected. Interests you, does she? Ha, ha! You'd be wasting your time there, my boy. Unless I very much miss my guess, she's attracted to a different sort of man: strong black hair, flashing white teeth, deep voice, very masculine, that sort of thing—like her old man used to be thirty years ago—no, make that twenty. Yes, she mostly just stays here during the day. She keeps house for me, reads, watches television; sleeps, I suppose."

"But no matter. I'd just as soon she did what she's doing. She has a small income, inherited from her mother, and I feed her. It's cheaper than paying a housekeeper."

The girl came in then with a tray on which were three cups of coffee, which she distributed impartially and, somehow, with an air of abstracting herself from any personal involvement in the act. She took a seat. The three formed a triangle, Dennis facing Trollope, the girl's bare left knee very close to his trousered leg. She didn't say anything during the conversation which followed, but behind her tinted glasses her eyes turned in Ralph Dennis's direction whenever he spoke.

"I can't get over it," said Trollope, tenderly fingering his left eye. His daughter favored him with a speculative look; but, even with such a cause as that, she didn't speak. "That whole society has somehow gone sour. It's rotten with hypocrisy. People are paying lip-service to sex, but inside they're burning with frustration."

Dennis echoed the phrase he had used at the Institute: "I wonder . . ."

Trollope swallowed wearily in the trough of his chair. "What is it you wonder, Dennis?"

"I wonder if you're not completely on the wrong track. Perhaps what has happened is that all repression has vanished. All. Not just sex, but of aggression too. In the world you found yourself in, they weren't repressing aggression."

Trollope laughed, either bitterly or scornfully. "I know they weren't repressing aggression. That's their problem."

"Yours, don't you mean?"

"You're very witty, Dennis. There shouldn't have been any aggression to repress. That's the point."

"I wonder . . . You're assuming that any sort of aggression is the result of frustration of some sort, that before there can be violence there has to be some damming and deflec-

"I said aggression is a natural human function. Your response is much too violent. . . It's like mentioning sex to a prude. He instantly thinks of rape and perversion."

tion of instinctual energies. I don't think that's true. Aggression is a natural human function—"

"Bah! It's been well established that rage, violence and murderousness are the result of thwarted functioning."

"Well, say it has been. It doesn't matter. I said *aggression* is a natural human function. Your response is much too violent, . . . but (forgive me) it's typical. It's like mentioning sex to a prude. He instantly thinks of rape and perversion. And if aggression is mentioned, most of us instantly think of the assassination of Kennedy and of muggings in the street. And yet such negative things are actually minority phenomena where sex and aggression are concerned. Because of the fearful repression, normal feelings and acts are assimilated to hellish ones—and that's done even more often with aggression than with sex because it obviously can be so much more directly threatening. Nevertheless," he went on, his voice again touched with a slight tremulousness, "the problem with our society at present is not so much the repression of sex—"

"Oh, it's not, is it?" interrupted Trollope, with something very like a sneer. "That's brilliant! I would have thought there was sexual repression. As with you, for instance. I suppose *you* are not sexually frustrated?"

Dennis's face reddened. Sally looked down at the rug; but an answering tint of red appeared in her face too. Dennis didn't speak for a moment and Trollope, lolling back in his chair, had distinctly the air of one who has scored heavily in a contest.

"I didn't say there was *no* sexual repression in our society. I'm sure there is. I was never so unreasonable as to think otherwise. As to whether *I* am sexually frustrated or

not, that has no bearing on our discussion, unless you can show that it is distorting my arguments or influencing my motives in presenting them—and I don't think you can do that, because I don't think they are. But to go on with what I was saying: The problem in our society at present is not so much the repression of sex as the repression of aggression. We have reached a stage in our social development where most of us take pride in being reasonable and tolerant—quite rightly, for those are very great virtues. But we all too often remain silent under unreasonable behavior from others. We allow ourselves to be pushed around by anyone in a position of authority; sometimes, by anyone who simply has an authoritative air. We hardly dare voice a thought, for fear of disturbing our friends. The result is that our self-esteem is lowered, our lives become clogged with all kinds of unfinished business—"

"I don't want to hear any of this, Dennis."

And indeed he didn't. It made him feel very uneasy. He sensed in it an implication that was most unpleasant to himself. For he was, as he well knew, a horrible bully. It was his life style, almost his life blood. He *bad* to bully people. He either had to dominate every group he was in or he would be its butt—that was his feeling. He well remembered what his life had been like in grammar school and high school; but when he had entered college, he had made a discovery that was to have the most important consequences for his entire life: he found that he could intimidate people. All he had to do was to be peremptory enough, aggressive enough, knowing and scornful enough. His large size made his menacing tone and manner plausible, although, actually, he was extremely weak and lacked energy—dragging that bulk about kept him perpetually exhausted. But what did that matter? He could be half his size, and still push around his peers, silence them, put them in their places—he knew that. He was not unintelligent and a carefully-gauging eye looked out from that massive head. He saw just how far he could go with this man and with that group and trimmed his sails accordingly. But when dealing with his family, his friends and subordinates, he never failed to observe the one great principle of his life: to overbear and to intimidate.

And they, his family and friends, decided that he was "quite a character" and made many laughing jokes about his domineering habits, his rudeness and coarseness, pretending to themselves that they were amused by him and had not been humiliated by him. Sometimes, lying awake in the silent hours of the night, he would wonder why the people he constantly offended, from policy and habit, didn't rise against him. Why didn't they league themselves together and, rising up in a scrabbling fury, overwhelm him and topple him down, bloody, bruised and dead? . . . and he would drift off to sleep troubled by splotched images and muffled jarring noises.

Asleep or awake, he was absurdly conscious of the possibility of violence. He constantly dreaded the blow that was never struck for nothing would have been so damaging to his *modus vivendi* as direct and explicit violence. This strong, even obsessive, preoccupation lay behind his present professional interest in the social and psychological causes of violence.

Nevertheless, he had some real ability in his chosen life work. Perhaps not as much ability as his late friend Arthur Lake; but then Lake was a genius and so didn't count. And

he very likely had less ability than Ferkin; a man who, if he could have gotten out from under Trollope's thumb, might have out-shone his senior in short order. Ferkin worried him sometimes. He always managed to keep the man under control, but just barely it required effort. But young Ralph Dennis, who had had such a brilliant scholastic career before coming to the Institute, didn't worry him at all. Mild-mannered and shy, Dennis was a naturally subservient man, a born minionite.

AND THAT MILD-MANNERED MINIONITE was now ludicrously saying: "Actually, there must be something wrong with any society in which two men can't have a friendly fist-fight—"

Trollope barked. "Hal! I'd like to see *you* in a fist-fight. Don't you think it just a little dangerous for a person of your puny build"—he thought that anyone of less than two hundred pounds was puny—"to advocate and condone physical violence."

"I am not advocating physical violence, although there are probably circumstances—not many, but some—in which I would, as you say, 'condone' it. But to go on—"

"Dennis," said Trollope, with a kind of stately severity, "I do not sit here to be lectured. I didn't ask you for an harangue."

"No, sir. But you did ask me to explain what I was wondering about the projected society and I was trying to do that. You wanted a world where people had released their full sexual energies. You thought that meant it would be a world without violence and probably, judging by your description of it, it is a world without murderous violence. But there was something you hadn't foreseen. Which is, that before there could be a society with absolutely no irrational sexual blockages, there would have to be an undoing of the inhibition of normal aggression. That's what you blundered . . . or, well, found yourself in—"

"So that's your idea of utopia, is it?" asked Trollope, with a grosser sneer than he had displayed yet. "A society where people habitually hit other people in the eye?"

Dennis was silent a moment. Then, resolutely. "Yes, if you want to force me to that extreme, it is. It's not that I care much for hitting people, and I certainly don't regard habitually hitting people as either pleasant or healthy. But I can't help recognizing that in a utopia—I repeat your word, utopia—I can't help recognizing that in a utopia hollies won't be able to push other people around. It wouldn't be a utopia if they could, would it?"

It was Trollope's turn to be silent. He sat as if paralyzed, staring: a stare that hardened gradually into a glare. A shudder went through him. Fumbling blindly for the deformed arms of his chair and never taking his eyes from Dennis's face, he heaved his enormous bulk to its feet, towered to his full height (6'5") and stood glowering down upon his visitor, who was decidedly overmatched. "So!" He quivered, as with an almost insupportable indignation. "So that's your idea of scientific speculation, is it?" The ferocity of his look was enhanced rather than impaired by that black and purple left eye. "That's your idea of hospitality? Of being a guest? You come into my home, you harangue and browbeat me—"

"I . . . I didn't do that," protested Dennis. The silent girl, sitting forgotten between them, turned her skeptical and speculative eye upon him.

Arthur Jean Cox

"—you come into my home and accuse me of being a bully. *Me! Well, sir,*" went on Trollope, his voice grating and groaning like a truck going up a steep grade, "this is the last time you are ever going to have that opportunity. This is the last time you are ever going to come here. And may I remind you, junior, that the terms of your employment at the Institute are up on the first and, believe me, this time they won't be renewed. You can accept that glorious offer from the Princeton faculty. Don't leave yet, stooge," for Dennis had made a movement as if to get up; "I still have a few words to say to you—"

But he didn't have a chance to say them. Dennis rose from his chair and his right arm, like an answering lightning to that dark thunder-cloud in Trollope's eye, flashed out in a blur of motion—and his fist struck the larger man in the right eye, struck him with such force that the massive head rocked on its foundations.

And Trollope sat down—collapsed—dropped, with a resounding *plop!* back into that Brobdingnagian catcher's-mitt of an easy chair, felled not so much by the force of the blow as by sheer astonishment. Dennis remained standing, as much amazed by his own action as was Trollope, but still staunchly defiant. The two looked at each other.

Silence abruptly shattered by a startling peal of laughter, from Sally. Her head thrown back, her body shaking with glee, the girl's laughter rang in the room like chimes, each note separate and distinct and seeming to hang in the air between them. Both stared at her, the older man uncomprehendingly, the younger with an altering expression. After a while the laughter stopped, almost without losing any of its clear articulation, and she sat looking up at Dennis, without a glance at her father, . . . as he, the fallen Colossus, sat stunned and open-mouthed.

Dennis turned to leave. He mounted the three steps to the landing, paused, looked back at her, speculatively. She rose from her chair, came towards him deliberately, climbed, . . . and put her arms about him. They kissed. She clung to him.

"Will you wait for me five minutes in your car?"

"I'll wait as long as you like."

She kissed him again. "Five minutes will be enough. I'll only pick up a few things. And then will you take me—"

"—wherever you wish."

"To your place?"

"Yes." And they clung again.

And in the living room below, his hands on the pudgy arms of his chair, his mouth loosely open, his right eye slowly blackening and reddening to match the other, the preposterous Trollope still stared. A shepherd against whom the sheep had arisen couldn't have been more amazed. He sat sunk over his head in speechlessness, in utterable silence, staring at his daughter and her new-found love.

New-found? Well, . . . not exactly. Her love had always been there, latently. It had needed just that gentle touch, the blow to her bullying father's eye, to bring it to life. That spark of rage and rebellion, answering to a need of her own—she had never been strong enough, alone, to roll that heavy bulk off herself—that spark had ignited her love; but the tinder-materials had always been there.

Dennis and Sally pulled themselves apart. She tripped up the stairs to fetch those necessary things, her bare legs flickering (but only for the moment) from his sight; and he

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Glen Bever

ILL WIND

"Ship? Long trip? Homer,
I'm not budging from this spot
until I know where all the ex-
citement is taking place. . .
Now talk!"



LL RIGHT, HOMER, what is it this time?" Jake Bardahl looked warily about the chrome-and-glass birdcage of the Office of Product Testing of the Leisureworld Corporation. "A nuclear cigarette lighter? A servomotor earwax extractor?"

Homer Stuttaford gave no sign of having heard. Finally he turned away from the panoramic view of Nuevo Santa Fe, smiled brightly at Jake, and announced: "We've got a little something we want you to field test."

Bardahl grunted noncommittally. He did not like the Corporation, he did not like this office, and he did not like Homer. Painful experience had convinced him that the small, wispy supervisor's angelic appearance concealed the reincarnation of Torquemada, and Jake was not about to cooperate in his own demise.

"It has passed all of its laboratory tests with ease," Stuttaford went on, "but let's face it: wind tunnels and furnaces lack the drama, the man-against-nature struggle that really grabs people and makes them care about a product. Agreed?"

Bardahl sighed, nodded. This sounded bad already.

"In short, Jake, the Advertising Office wants a complete color-and-sound record of it passing its final field test. Which it will, of course."

"Of course," Jake allowed. "With my help."

"Oh, it's foolproof," his boss assured him breezily. "Your, um, special talent for survival won't be needed this time."

"And you picked me because I'm so photogenic, right?" A humorless smile played across Bardahl's features, which could most charitably be described as "rugged." "It's just the way I'm built, Homer. The word 'foolproof' makes me nervous."

"Nothing to worry about," Stuttaford said, oozing sincerity from every pore. "Nothing at all to worry about," he repeated, staring abstractedly at the play of shadows cast on the far wall by Bolivar's twin suns. "Your ship leaves the spaceport in three hours. I'd pack for a long trip."

"Ship? Long trip? Homer, I'm not budging from this spot until I know where all the excitement is taking place. Now talk!"

Stuttaford turned reluctantly. "I don't suppose you'd be willing to wait for your sealed orders aboard ship?" Bardahl glared at him. "Oh, all right. You'll find out anyway, sooner or later."

"That's what I'm afraid of. Give!"

"It's the logical culmination of years of research into cheap, portable protection of man from the elements. The biggest breakthrough came over in Materials Science: a practical organic semi-conductor with a memory." He stopped, apparently finished.

Bardahl rose and began advancing on the older man. "The Corporation shrinks don't know it," he said conversationally, "but I have homicidal tendencies. And a short temper. Now, you were saying?"

The supervisor scuttled backwards, making patting motions in the air. "Take it easy, Jake! Let me show you." His crab-like retreat had ended behind the massive expanse of local 'oak' that was his desk. He knelt and began pulling a large, floppy white thing out of the bottom drawer. It billowed into a variety of surrealistic shapes as Stuttaford tried to jerk it clear of the drawer, crackling loudly with every movement.

Bardahl eyed it skeptically. "What's that, your grandmother's ghost? She's not very well preserved - but then, you always were a cheapskate."

Stuttaford bristled, no mean feat under the circumstances. "You will kindly leave my family out of this!"

"Okay, and you leave mine out of it."

"But you haven't got a family!"

"Exactly. Now, is that dings you're clutching down there the infamous 'it'?"

Stuttaford seemed glad to change the subject again. "It is indeed. Or rather, a prototype." He tried to throw it to Bardahl, but succeeded only in sprawling it messily across the red plush carpeting.

"Noisy, isn't it?" Jake observed. He picked it up by a thin metal plate that seemed bonded to the plastic sheet itself. The plate bore a lockable switch, currently in the *Off* position, and the legend: ALL-WEATHER INDIVIDUAL SURVIVAL MODULE (AWISM) ** LEISUREWORLD CORP. ** PAT. PEND. He looked at Stuttaford. "What happens when I flip the switch?"

"Go ahead and try it."

"Hmph." Bardahl activated the AWISM and took a large step backward. The amorphous pile shook and thrashed, rounding out into the shape of a gigantic, white grapefruit-half after five or six seconds. The rigid hemisphere, about six feet high, looked extremely solid.

"Go ahead," Stuttaford urged again. "Hit it! Kick it!"

Bardahl poked at the slippery plastic, gently at first, then harder. Within a minute he was satisfied that neither fist nor boot nor hunting knife was going to permanently dent the Module's geometric smoothness. It did indeed have a remarkable ability to rebound after being stressed. "Very nice," he admitted grudgingly. "I suppose the metal plate contains a battery?"

His boss nodded. "Exactly. It supplies a small direct current which renders the organic semiconductor material amorphous. When you flipped the switch *On*, the bias current stopped—"

"—and the memory-plastic returned to its originally fabricated shape." Bardahl finished for him. "I've heard of the technique, but not on such a large scale. Ingenious. But if you think you're going to ship me half-way across the galaxy just to field test some super puptent, you're even crazier than I thought!"

Homer backedpedaled some more. "The AWISM is *not*, as you so crudely put it, a 'super puptent'. The rigidform plastic has an inverse exponential response to deformation that—"

"I don't want to hear about it." Jake brooded for a moment. "What's the structural failure limit?"

"You want a number?"

"Uh-huh. I want to know how much pressure your super puptent will take before it collapses and makes a damn-fool sandwich out of the late, lamented J. Bardahl. Is that an unreasonable request?"

"Why, no." Stuttaford scratched his head, briefly looking almost human. "You can look it up in the technical reports, but it's something like ten tons to the square inch."

"Adequate. I hope." Jake grasped the AWISM in an awkward bearhug and hefted it. "Nice and light, a backpacker's dream. I trust it folds up into something smaller than a file cabinet?"

The supervisor muttered something about "practice"

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and produced a small pouch. He ran a stylus along the clearly marked edges of the AWISM's "door", actually part of the wall, and swung the rigid flap open. The battery/control panel was firmly fixed to the door's inner surface. "It wouldn't do to have a wild animal come along and accidentally collapse the Module on its occupant," he said soberly. He snapped the switch to the *Off* position, and the AWISM collapsed as promptly as it had sprung up. He gestured at the pouch. "It goes in here. Somehow."

Bardahl's expression of cautious approval gradually gave way to one of deep suspicion as he examined the caved-in Module. "All right, Homer, fess up. Why do I have to field this wonder gadget? What's wrong with it?"

"Why, Jake, I'm hurt that you would even think that I'm trying to trick you." When that drew no response, Stuttaford continued: "Besides, the AWISM has been thoroughly lab tested, and there's nothing wrong with it. Really."

"Does it burn?" Bardahl demanded

"Completely non-flammable."

"Does it get termites? Or bedbugs?"

"The AWISM polymer," Homer informed him with obvious satisfaction "will not pass even a skinny virus, and is less biodegradable than the most inert of fluorocarbons."

"Sounds pretty snug inside," Jake conceded. "Maybe too much so: how do I breathe in there?"

"The battery powers an osmotic pump: oxygen in, carbon dioxide out. Very selective," Stuttaford added. "The AWISM could float for hours."

"How did you find that out? Did your super puptent wash into some river?"

"It most certainly did not! The drain in the thunderstorm simulator backed up." Somehow Stuttaford found himself retreating again. "Besides, the Module can be anchored with tie-downs of the same rigidform plastic."

Bardahl pursued him around the curve of the desk, intent on continuing the conversation chin to chin. "Well, I'll bet it's drafty in the winter." Bardahl was getting desperate.

"The thermal conductivity is practically nil. Your own body heat would keep you warm at a hundred below."

Jake nodded slowly. "Homer, I'll grant you that your baby is the greatest thing since flush toilets. I will even admit that I might have been wrong about your motives in giving me this assignment. But before my world shatters completely, would you answer me one small question?"

"Certainly," said Stuttaford with a faint smirk.

"Why in hell do I need a bleeping *spaceship* to field your super puptent? What's wrong with the New Andes, up north in the really wild part?"

The supervisor hesitated slightly. "The country is rugged enough, Jake," he said. "But it lacks the one thing that Advertising is dead set on recording for the AWISM's baptism."

"But what? Sheer cliffs and mile-deep canyons, man-eating predators, blizzards - what else does Advertising want?"

"Tornadoes, Jake. Tornadoes."

ILL WIND

BETA HYDRI IV. Gravity: 1.10 g. Diameter: 8,750 mi. Axial tilt: 33 degrees. Rotation: 19 h, 14 m. Revolution: 412 d. No natural satellites. Atmosphere: 24% O₂, 74% N₂, 2% trace gases; 1.18 atm. sea-level pressure. Three large continents (22% of total surface area). Highest native life forms (Ts'o Analog System): non-vascular plants, arthropods. No known pathogenic organisms. No permanent surface station. Unsuitable for colonization due to large-scale climatic instability and frequent, violent storms."

Jake Bardahl's six-day trip to the planet called Windy was not the social event of the season. After his interview with Stuttaford, Jake had expected a bare minimum of a Leisureworld corporate cruiser, suitable for use as a Viking funeral pyre if it came to that. What he had actually gotten was a last-minute commission as first supernumerary on the Weather Service tender ship *Torricelli*, about to depart for *Beta Hydri IV* as first stop on a routine satellite maintenance tour.

The *Torricelli* had settled into synchronous orbit around Windy, resolutely stationary over Bardahl's destination, a fifty-mile-wide strip inevitably christened Tornado Alley. At the moment Captain Strangis was off in the tender's ground/orbit shuttle, making the rounds of the multitudinous Weather Service satellites monitoring Windy from a safe distance.

Jake was left behind with the First (and only) Mate of the *Torricelli*, Stan Hogrogian. A great brown bear of a man, Hogrogian was a computer specialist reluctantly completing the field tour necessary for promotion to a higher pay grade. He and Bardahl were united in their common origin, the communal agricultural world of Harvest, from which they had both escaped at the earliest available opportunity. Too, Hogrogian had almost as little to do as Bardahl on board the ship, since Captain Strangis was loathe to let anyone else touch anything functional aboard his ship. An emaciated octogenarian who spent eighteen hours a day prowling the stubby cylinder of uncertain vintage that was the *Torricelli*, running repeated systems checks, the Captain gave Jake the plain and simple creeps.

Bored with chess, and temporarily out of the obscene limericks to read into the *Torricelli*'s official log, Bardahl and Hogrogian lazed about the control room, periodically examining Tornado Alley under low magnification. Having read everything he could find about tornadoes in the Weather Service technical library aboard ship—and understood about half of it—Bardahl looked at the area with new awareness. The Alley was approximately centered in the big northern hemisphere continents called Arrowhead, a broad wedge aimed at the equator. The Cochise Mountains, a solid wall of fifteen-thousand-foot-plus peaks, ran the length of the land mass's western edge. "It's your classic set-up," he told Hogrogian unnecessarily, "just like North America on Earth."

"Even worse," the First Mate assured him. "The axial tilt here makes the seasons more extreme. It's spring down below, and the central plains suffer continual temperature inversions. Cool, dry air coming over the mountains—a giant sauna pushing up from the equator—all it takes is one good updraft to make the whole mess convectively unstable."

"And there it is," said Bardahl, indicating the tremen-

dous river of air, clearly marked by clouds, rushing out of the Western Ocean at two hundred miles per hour. "The jet streams on this planet are something else!"

"Yeah. Erratic. Why do you think the Weather Service spends so much time and money monitoring an empty world? Windy is a proving ground for us weather modelers: it's been the graveyard for half a hundred theories of storm formation. The adiabatic lapse rate is all wrong, the prevailing easterlies don't, the—"

Jake covered his ears in mock anguish. "Don't tell me all your troubles, Stan! I've got enough of my own."

"Granted," Hogrogian agreed at once. "You are, after all, the damn fool who's going *looking* for a tornado, no offense intended."

"None taken: truth is the perfect defense against libel! I only hope I don't find one. That's not an unreasonable request, is it?" Bardahl asked plaintively. "I read where the most tornado-prone place around has only been hit thirty times since 1892. And my super puptent and I will be a *lot* smaller target than Oklahoma City!"

Hogrogian shook his head. "Those Weather Service stats you turned up do *not* include *Beta Hydri IV*; if they did, Earth would come in a poor second. How do you think Windy got its name? Not only are its tornadoes somewhat more violent than the old 'prairie twisters,' they're a hundred times more frequent. Odds are you won't have to wait more than two or three days after we set you down."

"Stan, you are a source of infinite comfort to me in my hour of trial. How much more violent is 'somewhat'?"

The First Mate looked genuinely sorry that he had brought the subject up. "Uh, Jake, you don't really want to know." Upon further consideration, Bardahl decided that the other man was right.

BARDHAL WAS BORED. Hogrogian's prediction notwithstanding, Jake had been sitting on the statistically most dangerous spot in Tornado Alley for over a week, and had seen nothing more spectacular than a few good thunderstorms. All the recording instruments that Advertising had saddled him with were deployed at strategic vantage points, some as much as a mile away, poised to record the AWISM's performance for posterity. Regardless of the tornado's path through what Jake had christened Camp Dementia, at least one should survive. He kept the remote-control activator in his pocket at all times; the recorders would not roll until something threatening appeared on the horizon. Jake had insisted on a transparent Module for the field test, but had no desire to become a posthumous star in Homer Stuttaford's home movies.

Camp Dementia sat in the middle of a broad plain. As the *Torricelli*'s shuttle brought him down, Bardahl had seen great gashes criss-crossing the Alley, fresh furrows hundreds of yards wide turned up by a gargantuan plow headed northeast. Once on the ground, however, the landscape consisted of miles of monotony stretching off into boredom. The local flora and fauna were equally entralling: bilious chartreuse creepers passed for grass on Windy, while the native "insects" avoided him with an intensity that was almost insulting.

As a result, Jake spent several hours each day on the radio conversing with an equally bored Hogrogian aboard the *Torricelli*. The tender had dropped into a lower orbit for "close support" of Operation Ill Wind. An unfortunate by-

product of that orbit was the fact that the ship was only above the horizon about half the time. True to the normal afternoon pattern, the static was getting worse and worse, until finally Bardahl broke off the telling of a singularly slanderous story about a Leisureworld vice-president. "Hey, Stan, that's what advertised heavy weather getting close?"

"Amen," came the confirmation after a minute. "The jet stream tore across the leading edge of that cold front just west of you about an hour ago, and from here it looks like all hell is breaking loose down there. Time to tie the outside house down!"

"And me with wash on the line," muttered Bardahl.

"What?"

"Never mind. The interference is getting bad, and I've got some chores to do. Call you back on your next pass over."

"Okay, and—good luck."

"Thanks." Jake sighed, snapped off the radio set, and went out to check the Module's tie-downs for the hundredth time. Satisfied that the AWISM was anchored as securely as the crumbly red soil would permit, he strolled over to a nearby knoll and began a careful examination of the sky.

It was late afternoon of another miserable day, hot and humid. A stiff southwest breeze had sprung up while he was talking to Hogrogian, providing marginal relief from the oppressive mugginess. Black thunderclouds were rapidly filling the sky, concentrated in the north and west. As the wind quickened, Bardahl noted with alarm that the bottom of the inky cloud mass was bulging downward in places as though restrained by a gigantic, invisible wire mesh. Greenish lightning flickered across the horizon in sheets; a lurid glow suffused the cloudbank. Jake activated the recorders. "I do believe," he announced to the empty plain, "that I am in for it this time."

As if in punctuation, huge hailstones began pelting the ground, pummeling Bardahl as he made a run for the AWISM. By the time he succeeded in sealing the door, the white stuff lay an inch thick on the plain and one rather jagged stone had drawn blood. "Now I begin to understand 'somewhat more violent,'" he grumbled, wincing as he cleaned the gash in his scalp with supplies from the emergency medikit. "Damn, that smarts!"

Despite the drastically reduced visibility, Bardahl kept a wary eye on the southwest. Contact microphones on the AWISM's outer surface gave the first warning, filling the Module with a gradually swelling roar like an immense blowtorch. A funnel cloud about a hundred yards wide emerged from the wall of rain, a tapering column the color of blood from the reddish earth it had ripped up in its passage across the battered plain. Jake gauged its speed and heading, then checked once again that he and everything else in the AWISM were strapped down.

The tornado came on at a leisurely pace. Jake had never before been so close to the concentrated fury of nature's most convulsive storm, and he found it as awesome as it was terrifying. The funnel turned an utterly incongruous dirty pink as the tornado's leading edge reached the drifts of fallen hail and vacuumed them up.

A lengthy minute later the outer winds struck one of the utility outbuildings Bardahl had erected: it held for a few seconds, then exploded as the tornado's core passed over it. The sound of the shed's detonation was swallowed up by the steady roar as efficiently as the whirling funnel sucked

up the wreckage.

The tornado continued to bear down on the AWISM. Jake stared in horrified fascination at the indistinct outline of the funnel: it was going to strike the module, but not head-on. Bardahl was still trying to figure the angle of approach when the storm struck. The AWISM's transparent walls bulged inward under the shock of the winds, while such varied missiles as boulders, hailstones, and a laser post-holer from the shed battered against the rigidform plastic, deforming it alarmingly. The storm had long since crushed the outside microphones, but its deafening roar still filled the tiny room, numbing Jake's ears.

As suddenly as it had struck, the tornado was gone, headed northeast, pulverizing prairie with the same savage efficiency with which it had leveled Camp Dementia. Bardahl looked around, still dazed. The AWISM had returned to its accustomed hemispherical perfection: it was the only thing in the area projecting more than three inches above the ground. Shaking his head to dispel the ringing in his ears, Jake tried to remember what to do next.

Thinking aloud helped. So did two ounces of the bourbon he had somehow fitted into his weight allowance for the *Torricelli*. "Let's see: it's stopped raining, and it'll be dark soon. If I don't recover the record tapes from Advertising's mechanical voyeurs now, I'll have to wait till morning to get off this rock. Ugh." His shiver was not warranted by the still muggy weather.

The Module's door swung open without difficulty. Bardahl stepped out and began slogging toward the nearest surviving recorder station, about a mile from camp. He made slow progress through the treacherous muck the tornado had left behind. The silence on the plain was almost tangible, disturbed only by the squishing of his boots in the reddish gumbo. Bardahl began to whistle Schubert's *Marche Militaire* loudly, then gave it up. It only emphasized his solitude on a planet suddenly grown hostile.

He had almost reached the first recorder station when he heard it, a sound from his youth on Harvest, the ominous buzz of a swarm of infuriated honeybees. Startled, he glanced back over his shoulder and identified the source of the peculiar hissing, buzzing sound in one stricken instant: a tremendous funnel cloud, still aloft but dropping rapidly earthward. Unbidden, part of his reading aboard the *Torricelli* presented itself: THE CITY OF AUSTIN, TEXAS, WAS STRUCK BY TWO TORNADOES WITHIN HALF AN HOUR ON 4 MAY 1922. Bardahl swore and activated the recorders again.

He tried to run for the AWISM, and immediately slipped and sprawled in the rusty mud. He picked himself up and began tramping back to the Module at the greatest practical speed, which would have elicited a sneer from both hare and tortoise. It was still hard work. Such breath as Bardahl could spare was devoted to impartially cursing the planet, every advertising man who ever lived, and himself. Before he had covered a tenth of the distance to the AWISM's dubious safety, the tornado touched down. As the vortex ripped loose great chunks of earth, it darkened and the noise changed to the thunderous, bone-shaking roar of a million chemical rockets all lifting off at once.

Sonic booms began to crack across the plain, adding to the cacophony. WIND DAMAGE INCREASES AS THE SQUARE OF WIND VELOCITY, his memory announced. Jake tried to remember the speed of sound in Windy's at-

mosphere as he staggered through the mud, although the question did seem somewhat academic just then.

It was hard to judge distances on the open prairie, but Jake guessed that the tornado would reach the Module well before he did. Was there any way to avoid it? ONE CAN EASILY OUTRUN THE AVERAGE TORNADO BY DRIVING DUE EAST TO FIFTY OR SIXTY MILES PER HOUR. Scratch that. FEW PEOPLE SURVIVE IF THEY ARE CAUGHT IN THE OPEN BY A TORNADO—THE ONLY RELATIVELY SAFE PLACE IS A HOLE IN THE GROUND. Since none of those presented themselves, Bardahl kept on slogging, knowing that he was not going to make it.

His estimate was correct. The tornado was moving so fast that the funnel was nearly horizontal in places, and the base of it was continually becoming airborne: it would lift off the ground for several hundred yards, then drop back down to resume its methodical destruction. The storm raced toward Bardahl at a pace he had no hope of matching. As its leading edge struck the AWISM, Jake was himself slammed flat in the mud by a stray eddy. He got to his knees in time to see the Module ripped free of the ground and sucked whole, still trailing its rigidform plastic tie-downs like some great, demented kite, into the dirty red vortex. It suddenly put the tornado in scale. "The damn thing must be half a mile wide!" he breathed.

He remained there, on his knees in the mud, strangely calm. He watched the giant twister thundering down on him, eyes fixed on its base. There was a glimpse of daylight, then another—the funnel cloud was slowly, reluctantly lifting off the ground. The strident buzzing of a million bees streamed by only yards over Bardahl's head, the wind buffeting him violently. Suddenly it stopped. The world was utterly still as Jake looked directly up into the heart of the tornado.

He caught a whiff of ozone before the pressure drop of the "eye" made it impossible to inhale. Bardahl forgot his discomfort as he stared, mesmerized, into the core of the fury about him. A circular opening perhaps a hundred feet wide extended upward as far as he could see, sharply delineated by a wall of close-packed, furiously revolving clouds. The eye was not dark, as he had expected, but was rather a chaotic display case for every kind of lightning imaginable. There were weird green flickerings, vicious blue-white bolts zig-zagging from one side to the other, pulsating ball lightning like that drifting down toward him right now—

BARDAHL REGAINED CONSCIOUSNESS some time after the tornado had disappeared. Aside from a few second-degree burns and a pounding headache, he felt absolutely rotten.

The sky was once again clear. Searching by the fading rays of *Beta Hydri*, he found the remains of the AWISM half a mile to the northeast, not far from a still-functioning recorder. The Module's switch was still locked on the *On* position. "That," observed Jake, "is as clear a case of product misrepresentation as I have ever seen." The All-Weather Individual Survival Module was totally limp, and appeared to have been fused in several places. "That's what a quarter million amps will do for you," he added philosophically. Nonetheless, most of the Module's original contents seemed to be present, judging by the number and shapes of the lumps within.

Glen Bever

Jake recovered the bourbon flask and the radio set by a modified Braille technique, then smoothed the AWISM out on the ground like a picnic blanket. "After all," he asked the first star to appear in the darkening sky, "what can the medikit do for me that good whiskey can't do faster and more pleasantly?" When the star did not reply, Bardahl nodded emphatically and collapsed.

Within minutes Jake realized that the "star" he had been addressing was moving across the backdrop of unfamiliar constellations much too fast for any well-behaved celestial object. "The shuttle!" he exclaimed.

The radio set had been designed to take a beating: Hogrogian answered Bardahl's CQ almost immediately. "Jake, you're alive!"

"Surprised?"

"Um, just a little. Strangis counted about sixty twisters tearing through your neighborhood in the last hour. They were so thick they were tripping over each other! Did you get your field test on tape?"

"Both of them," Bardahl assured him, stifling a yawn.

"Both? Never mind, you can tell me later. I'll be down to get you—damn it, no I won't. I forgot: with no landing field lights, I might fry you trying to home in on the beacon."

"No, thanks! What's the weather forecast, expert?"

"Clearing and slightly cooler. No more storms for at least a day," Hogrogian announced.

"Best news I've heard all day."

"Speaking of news," the First Mate added with studied casualness, "a memo from Homer Stuttaford came in while you were busy down there. He said to hurry back, that he had something that only you could field-test. I don't recall all the details, but it was something about surgically implanting gills and radio-isotope power plant under your clavicle—"

"Gack!" After a brief, reflective silence, Bardahl let go a mighty yawn and stretched luxuriously. "What the hell, pick me up in the morning anyway! Maybe the ship will get holed on the way back." He switched off the radio set, took a final swig of the bourbon, and was asleep before he hit the ground.

Somewhere to the west, a wind was rising.

Cox cont.—from page 33

stood looking into the living room where the Director of the Institute for Future Research sat profoundly contemplating the present and making (no doubt) various projections as to the future.

"I've struck a blow for love," mused Dennis, "a blow for utopia." He had meant it to be only a thought, but it uttered itself aloud and dropped into the silence of the sunken living room like a stone into a pool of water. He seemed to sense a circle of ripples spreading out from it—spreading wider and wider.



Robert H. Davis and
Perley Poore Sheehan

EFFICIENCY

"After countless experiments, we can now take a soldier, no matter how badly wounded, and return him to the trenches—a supersoldier—no longer a bungling, mortal man—but a beautiful, efficient machine!"

The actors who appeared in this original production are unknown to us, but deserve some credit. This edition of the play was originally published by the George H. Doran Company, New York

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THE PERSONS OF THE PLAY

THE EMPEROR, a person attired in military costume, indicating the highest order of elaborate modern mode, sage green in tone. He wears a short, olive-coloured cape coat, the left flap of which is thrown back disclosing: (1) The Order of Merit; (2) the Triple Cross; (3) a seven-starred emblem of diamonds, emeralds and rubies, known as the Reward of Heaven, designed by the Emperor himself and bestowed by the grace of the Almighty upon His Majesty's Imperial person.

THE SCIENTIST, a small thin man, garbed in frock suit, flowing black tie; thin of face; bulging eyes; horn spectacles; heavy head of grey hair; thin, straggly, grey beard and small moustache. He is very animated. He wears a long, Inverness style dark overcoat and carries a portfolio containing reports and statistical matter.

NUMBER 241, stands six feet; is very erect and stiff of posture; closely cropped hair; large face, rather heavy of expression. Upon entering he is garbed in full-length wargrey cloak, with wide band at waist buttoned in front; the conventional metal war helmet now in general use; hands in white-cotton gloves. He moves with the deliberation of an automaton. In reality he is fifty percent human and fifty percent machine, being composed of (1) left artificial leg; (2) two artificial hands; (3) artificial right forearm and elbow; (4) artificial left eye which SCIENTIST has converted into a telescope; (5) artificial left ear which is also a telephone; (6) all his teeth are metal—synthetic gold—but cheaper and harder. He can bite barbed wire in twain. Underneath his great cloak he wears the regulation infantry uniform and a bayonet in a scabbard. His speech is laboured.

SCENE

Private audience chamber of an Emperor, in purple and gold, with magnificent throne-chair carved elaborately, a canopy extending over the seat. Regal flat-top table left centre containing mounted figure of the Emperor in bronze and a large mushroom gold gong. A purple-and-gold cloth falls over both ends of the table. The cloth is decorated with crown and sceptre. Heavy purple curtains fall from back wall. A modern rifle leans against the left back corner.

(At rise of curtain stage empty. Enter the Emperor followed by the Scientist—the Emperor with a curt and pre-occupied air, the Scientist with an air of fawning enthusiasm.)

EMPEROR: *(Crossing toward throne-chair, in which he seats himself.)* Proceed! Proceed!

SCIENTIST: *(Placing portfolio on table and smilingly rubbing his hands.)* Modesty, Sire, causes me to falter.

EMPEROR: *(Without enthusiasm.)* My time is limited. The Crown Prince awaits me.

SCIENTIST: *(Quivering with enthusiasm.)* When your Majesty comprehends this greatest of all birthday gifts!—a million cripples transformed into a million fighting units!—your Majesty's might becomes terrible!

EMPEROR: *(Indulgently.)* Generalities!

SCIENTIST: I particularize *(as Emperor makes sharp gesture that he is ready to listen)*. The keynote of efficiency is the elimination of waste. Our problem was to eliminate

the waste represented by the wounded. In brief—we have succeeded.

EMPEROR: (Beginning to display interest.) How so?

SCIENTIST: After countless experiments, we can now take a soldier, no matter how badly wounded, and return him to the trenches—a supersoldier—no longer a bungling, mortal man—but a beautiful, efficient machine!

EMPEROR: (Laughing.) You are enthusiastic but—not contagious! (deprecatory gesture)—but—(sternly)—your promises have not always been kept. The proof!

SCIENTIST: (With impulsive devotion.) Your Majesty, I foresaw your doubts. I brought—

EMPEROR: Ha! A—specimen!

SCIENTIST: (Appreciating the *jeu d'esprit*.) Perfectly! He is in the ante-room.

EMPEROR: (Curtly.) Bring him in! Bring him in!

SCIENTIST: Er—I beg your Majesty's pardon—but—he is not—altogether pleasant to look upon.

EMPEROR: Nonsense! Whatever makes for the strength of the dynasty is agreeable to the imperial eyes.

SCIENTIST: (With tremulous delight.) May I?

EMPEROR: Certainly! Make haste!

SCIENTIST: (Nimbly crosses to door, opens it, and ejaculates command.) Attention! Forward! Hep! (There is a momentary silence, then a metallic clatter as if caused by a movement of iron, then a heavy step. Enter 241, erect, with measured tread, observing nothing. He comes down to centre of stage, where he stops in response to the Scientist's order.)

Halt! (As 241 stands at military attention, the Scientist, with manifest delight, flutters bowing before Emperor and explains.)

The ultimate triumph!—our two hundred and forty-first experiment—Hence—Number Two Hundred and Forty-One! (During this explanation 241 does not stir.) (The Emperor stares at 241 with a sort of horrified fascination.)

EMPEROR: He—marches—splendidly!

SCIENTIST: The least of his accomplishments. Permit me! (Returns to 241, whom he prods, 241 remaining impulsive.) Magnificent! (gesture of approval as he carries on inspection of arms, bands, body and head of 241. Runs finger around left eye, taps gently left ear. Contemplates ensemble and makes gesture for 241 to open mouth. 241 opens mouth and shows glittering array of metallic teeth; he shuts them with click like a steel trap). Perfection! Right arm! (241 lifts right arm in stiff but sweeping gesture.) Left knee! (241 crooks left knee twice.) Hands! (241 opens and closes both cotton-gloved hands and manipulates fingers.)

EMPEROR: You guarantee his efficiency?

SCIENTIST: Absolutely.

EMPEROR: Demonstrate.

SCIENTIST: (Approaches 241, who continues to stand immobile, and very swiftly removes helmet, long cloak and cotton gloves, disclosing two metallic bands and wrists.) You ask me, your Majesty, if he is efficient. I reply, more efficient than before he fell in battle. (Crosses to corner and gets rifle. Returns to centre.) Two-forty-one, attention! Observe, your Majesty! (Scientist tosses rifle to 241, who catches it surely but stiffly in his metal bands, against which the weapon clangs. Scientist puts 241 through manual of arms. The whole scene following is punctuated by military commands in the following order.)

"Attention!"

"Carry arms!"





"Present arms!"
"Shoulder arms!"
"Parade rest!"

And now, your Majesty, mark this! (resuming orders):

"Fix bayonets!"
"Make ready!"
"Aim!"
"Fire!"

(241 completes maneuvers by pulling trigger and snapping lock, whereupon Scientist takes rifle and tosses it to settee.)

EMPEROR: (Leaning forward with look of wonderment in his face.) Colossal! (241 comes to attention and is inert again!)

SCIENTIST: Are not the possibilities impressive?

EMPEROR: Beyond our dreams!

SCIENTIST: I estimate the restoration of five army corps immobilised because of missing arms and legs, deafened ears and blinded eyes.

EMPEROR: (Meditatively.) Something of a shock—to-civilisation!

SCIENTIST: (Exultant.) Stupendous! We recruit from the hospitals!

EMPEROR: (With dawning realisation of the magnitude of the suggestion.) And the hospitals are overflowing! My dear Professor! Science is the hope of the dynasty—

SCIENTIST: Is it not amazing?

EMPEROR: Quite!

SCIENTIST: (Proceeding with examination.) A test for the ear! (Scientist taps left ear of 241 gently, then crosses behind throne-chair right and makes three light taps

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on back of chair discernible to audience, while 241 bends ear attentively in that direction, half-turning body. Scientist reappears. 241 resumes original posture, salutes and holds up three fingers.)

EMPEROR: (Peering around at Scientist.) What are you doing?

SCIENTIST: I tapped the throne three times, very gently. Did your Majesty not hear?

EMPEROR: No.

SCIENTIST: Ah, but the supersoldier did—ten paces distant! It is stupendous. (He crosses to table, opens portfolio, takes out a small white card.) (To Emperor.) With your permission. (To 241). What is written hereon? (241 closes right eye and stares fixedly with left.)

241: Noth-ing.

SCIENTIST: (Smiles knowingly at Emperor. Turns card over.) Ah, very good. (Scientist holds card up again.) Once more.

241: (After a moment of staring he reads deliberately.) A—nation's—will—should—be—the—will—to—power!

EMPEROR: takes card from Scientist and glances at it.) Correct!

SCIENTIST: (Crossing to centre and returning card to portfolio, then addressing Emperor.) This is my greatest achievement. Never has science done so much for the human animal. From a shattered, bleeding wreck of no value to his country I have made him into an efficient man—hands of steel, leg of bronze, arm of nickel and aluminum, telescopic eye, an ear that— 241 bends his ear off stage left.)

EMPEROR: (Startled.) You hear something? What do

you hear?

241: A—bugle-call—sounding the assembly!

EMPEROR: Impossible! Open the door! (Scientist opens the door and distant bugle-call is faintly heard off stage.)

EMPEROR: (In astonishment.) God in heaven! Miraculous! (as Scientist gently closes door aglow with triumph). What have you accomplished?

SCIENTIST: (With fervour.) A resurrection!

EMPEROR: Complete!

SCIENTIST: A triumph over matter. The fragment of a soldier reconstructed under the magic touch of Science, without which he would to-day be rotting on the field—a source of pestilence—a worthless thing. Science set him on his feet, gave him a leg, an arm, hands, a telephonic ear, a telescopic eye!

EMPEROR: (Leans back and deliberately inspects 241.) How long have you been in my service? (241 hesitates and salutes.)

SCIENTIST: You may speak.

241: Eighteen—years—Majesty.

EMPEROR: Married?

241: Yes, Majesty.

EMPEROR: Children?

241: Seven—Majesty.

SCIENTIST: Five sons!

241: (Bitterly.) One dead—three—at—the—front—my youngest follows—

EMPEROR: His age?

241: (Swallowing.) Sixteen!

EMPEROR: (Coldly to Scientist, referring to 241.) When does *his* furlough end?

SCIENTIST: Noon, to-morrow. By nightfall he will again be in the trenches.

EMPEROR: (Reflectively.) And if he returns—I will award him the Triple Cross. (More brightly.) This will stimulate the military ardour of the Crown Prince. It will delight him to see this—reassembled soldier.

SCIENTIST: (Recalling an important detail.) And moreover, your Majesty, there is this aspect to be considered. We are manufacturing human extremities on a standard, interchangeable basis. For example, as your Majesty perceives, this left leg—(picks up ruler from desk and raps left leg of 241, which gives out metallic ring), is metal. As is also his left forearm, including the elbow. (Taps it.) And both hands. (Taps them also.) 241 receives these attentions stoically as each member of his body clangs in a different note.) Furthermore, your gracious Majesty, if any or all of these parts are shattered in the course of battle, our corps of trained mechanicians, ever at hand, supplies the parts by numbers, and the fighting unit embodied in the individual returns with but little loss of time and the minimum of inconvenience to your Majesty's service.

EMPEROR: What does he weigh?

SCIENTIST: Equipped? (Emperor nods.) One hundred and seventy-five pounds.

EMPEROR: And without his equipment?

SCIENTIST: One hundred and five.

EMPEROR: (Brushing his band across his forehead.) Little more than half a man.

SCIENTIST: True, your Majesty. And therefore requires but half the rations, half the care of a whole unit. There is that much less to nourish.

EMPEROR: You have brought about the greatest advance in the history of civilisation. Tell me, what else of the telescopic eye? That interests me. I shall be surprised at nothing. Your achievements baffle.

SCIENTIST: The telescopic eye, your Majesty—(Scientist circles the left eye of 241 with his finger) is superior to the human eye in two important characteristics. First, it possesses the telescopic quality as you have observed; and second, its power is undiminished by darkness.

EMPEROR: (With incredibility.) You mean he can see in the dark?

SCIENTIST: Just that. And moreover, your Majesty—

EMPEROR: Halt! This is very interesting. We will test

that also. Demonstrate.

SCIENTIST: (Dubiously.) Does your Majesty object to darkness?

EMPEROR: (Hesitates; then replies with an effort.) No. The electric switch is there (points to white button on the table).

SCIENTIST: (To 241.) Right about face! Give attention to His Majesty! (Scientist crosses to table and lays his finger beside the button. 241 observes the whole transaction carefully. To Emperor.) I will switch off the light. Be so kind as to perform any act you may, and he will describe your movements. Are you ready?

EMPEROR: (Bracing himself in the chair.) Lights out! (Scientist presses button. Stage is in total darkness.) Describe my movements as they occur.

VOICE OF SCIENTIST: (To 241.) Do you understand His Majesty?

VOICE OF 241: Yes. He—leans—forward—in—his—chair. He—lifts—both—his—hands. The—palms—come—together. He—bows—his—head—in—prayer.

VOICE OF EMPEROR: (Sharply.) Lights! (Scientist presses button. Lights on, disclosing Emperor exactly in the attitude described by 241, with a startled look on his face, palms still together.)

SCIENTIST: Enough, your Majesty?

EMPEROR: (Relaxing nervously.) It is beyond human understanding. (Recovers himself and rises)—And it gives me infinite happiness to bestow upon you this mark of our esteem. (Takes from his own breast the Order of Merit and pins it on breast of Scientist.) The Order of Merit! There is but one higher decoration—the symbol of Divine Right—the Reward of Heaven. (Emperor lays his band on the seven-starred emblem.) Which I alone possess.

SCIENTIST: (Overwhelmed, bows and kisses Emperor's band.) Your gracious Majesty! To have received this from your imperial hand on your Majesty's birthday is indeed a distinction. (A furtive glance escapes 241, a thin smile reveals his metallic teeth; a sinister look comes into his eyes. Emperor reseats himself with a gesture of benediction.)

EMPEROR: I marvel at his dexterity—at his auricular powers—at his incomparable eyesight! What is his range of vision?

SCIENTIST: Your Majesty, he can see the enemy twenty or thirty miles away, count its cannon, its horses, its equipment.

EMPEROR: (Quickly.) Wait! I will make another test. I carry next to my heart the smallest copy of the Bible extant. It can be read only under a microscope. Is the test too severe?

SCIENTIST: On the contrary, your Majesty: it is pref-

EFFICIENCY

erable. (Crosses and takes Bible from Emperor's hand, Turns to 241.) Attention! Right about face! (241 salutes.) I open the book at haphazard. Read a verse from this page.

241: Matthew—Fifth—Chapter—fourth—verse. "Blessed—are—they—that—mourn—for—they—shall—be—comforted."

SCIENTIST: The fifth.

241: "Blessed—are—the—meek—for—they—shall—inherit—the—earth." (Scientist turns to Emperor and bows, the book still open in his bands.)

EMPEROR: He is right. I am familiar with Matthew. Turn to another page. (Scientist opens the Bible elsewhere. Holds it up.)

SCIENTIST: (To 241.) Attention! Read.

241: Isaiah—Third—Chapter—fifteenth—verse. "What—mean—ye—that—ye—beat—my—people—to—pieces—and—grind—the—faces—of—the—poor—saith—the—Lord—God—of—Hosts."

EMPEROR: STOP! (Emperor leans back in his chair under stress of great emotion, his hand sweeping his brow repeatedly. Scientist closes the book, bows again with greater humility and returns the book to Emperor.)

EMPEROR: (Takes book and thrusts it in his bosom.) His powers are diabolical. I wish to experiment with him alone. (Relaxes and gazes vaguely into the distance. Scientist drops portfolio and coat on settee.) Haste! I will summon you with that bell. (241 remains stolidly at attention, an expression of awakening purpose in his eyes.)

SCIENTIST: Your Majesty commands. (Bows elaborately. Exit Left. Emperor with Imperial dignity stares 241 down after a duel of the eyes, imposing his will upon the soldier. Follows a moment of inspection in which wonderment is the dominant note. He rises from the throne and walks slowly half way around the impassive soldier, studying him critically. Emperor's expression changes to bewilderment tinged with fear. The situation is uncanny.)

EMPEROR: Where were you born?

241: In—the—South—Majesty.

EMPEROR: Your trade?

241: (With a helpless, involuntary gesture, extending his bands.) I—was—a—florist. (Emperor stares at the metal bands, 241 observing the expression.) I made—bouquets. Not—with—these—(Emperor averts his face)—but—with—my—absent—hands.

EMPEROR: (Reseating himself.) War is not a festival of flowers.

241: Majesty—a wreath—I could make—slowly—for the dead. (He leans toward the Emperor.)

EMPEROR: (Observing the somewhat cynical note of the soldier, becomes grave.) Are you not grateful to Science for these wonders performed? (241 salutes.) Speak!

241: What—shall—I—say?

EMPEROR: You are a man again—you are whole once more!

241: Yes—Majesty. But—my—heart—is—broken.

EMPEROR: Why?

241: My—people—are—starving—my—wife—is—lonely—

EMPEROR: Then you are not proud that Science has found a way to double the strength of our Army?

241: By—bringing—me—twice—to—slaughter.

EMPEROR: (Leaning forward, with ferocity, his hands on the arms of his chair.) What, ingrate?

241: By—doubling—the—strength—of—your—army—you—have—multiplied—human—grief. (Takes two steps labori-

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ously toward Emperor.)

EMPEROR: You dare rebel in the presence of your Emperor?

241: Dare? The-fear-has-gone-out-of-my-tortured-body-into-yours. (Takes another step toward electric button, his heavy feet sounding ponderously. Emperor cowers back in the chair, bollow-eyed.)

EMPEROR: Down on your knees and crave your Emperor's pardon!

241: That-part-of-me-which-is-steel-cannot-bend-to-mortal-man. I-will-get-down-on-my-knees-only-to-God-and-ask-Him-to-forgive-me-what-I-now-intend-to-do. Twice-in-the-red-shambles-of-the-trenches! I-am-the-hope-of-the-dynasty? (throws his arm wide). No-I-am-the-hope-of-the-people! (with trembling rigidity 241 reaches toward electric button). The-day-of-your-birth-shall-henceforth-be-known-as-the-day-of-your-death-and-celebrated-as-the-birth-day-of-liberty! (241 smashes electric button with his steel hand. Total darkness follows. Two slow footfalls are followed by a gasping intake of breath from the throne-chair.)

VOICE OF EMPEROR: (In terror.) Lights. Lights!

VOICE OF 241: I-need-no-lights.

VOICE OF EMPEROR: (Gaspingly.) Lights!

VOICE OF 241: You-have-made me-live-in the dark-and now you shall-die in the dark!

VOICE OF EMPEROR: (Choking.) Mercy!

VOICE OF 241: You-cannot-escape-me-in-the-shadows. I-can-see-you-I-can-hear-you. Come-to-my-iron-arms! Don't-tremble! Don't-shrink! Go-as-a-king-should-go-to-meet-the-King-of-Kings! (A rush of feet; an overwhelming impact of bodies; a shriek of agony from the depths; the overturning of the throne; a scuffle in which the human body minglest with the rattle of metal; a long, choking, gasping blast; a ripple of stertorous breath; the clink of metal as 241 gets to his feet. Silence. Again the ponderous footfalls are heard crossing the room, which is still in darkness. 241 puts on his overcoat, his helmet, etc. Footfalls are again heard crossing to the table. 241 presses the electric button. Lights.)

(There stands 241 in full equipment, the Emperor lying at the foot of the shattered throne crumpled up in the most unkingly attitude, the emblem known as the Reward of Heaven, glittering in the light. 241 bends down, rends it from the Emperor's bosom, fixes it upon his own left breast, comes to attention, and rings the gong on the table, which gives out a low reverberating note. 241 then turns to the door and stands with his arms stiffly suspended at his side, his chest thrown out and a light of victory in his eyes.)

(Enter Scientist, left. He takes in the whole terrible scene, cowers back.)

SCIENTIST: (Gasps as he stares at 241.) What is this?

241: (Raising his metal fingers to heaven with an air of thunderous, choking finality.) EF-FI-CIEN-CY!

(Curtain.)

METROPOLITAN
432 Fourth Avenue
New York

November 8, 1917

Office of
Theodore Roosevelt

Mr. Robert H. Davis,
Mr. Perley P. Sheehan,
8 West 40th Street,
New York

Gentlemen:

I very heartily congratulate you, as an American, upon having produced this piece in the form of a play and in now producing it in the form of a story. You teach a great lesson. You show in dramatic manner how the Prussianized militaristic autocracy of the Hohenzollerns has turned Germany into an inhuman machine for the destruction of what is highest and best in mankind. Germany today occupies, toward other peoples, and to a great extent toward her own docile and deluded workingmen and peasants, a position which in point of international morality does not essentially differ from that of the Mongols under Genghis Khan, and the Tartars under Timur. But in addition to this imitating the Mongols and Tartars, the Germany of the Hohenzollerns has brought every resource of a materialistic civilization, and especially every resource of a materialistic science to aid in the wide-spread application of their brutal, treacherous, and merciless world-ethic. In consequence, Germany has made herself a source of horror and of danger to all free peoples.

You have well set forth the hideous evil of German militarism. To complete the picture, however, we must steadily keep in mind how this brutal militarism has been aided by the advocates of a non-moral and unmanly pacifism in certain other countries, including our own. The American professional pacifist has been the efficient ally of the brutal German militarist. Each alike has failed to understand that righteousness must be our aim; that we must endeavor to secure justice and fair-dealing and mercy as between man and man, as between man and woman, as between nation and nation; that in the long painful struggle to achieve these ends, weakness and timidity are traitor virtues, sham virtues; and those who profess and practice them give aid and comfort to the apostles of brutal wrong-doing.

Sincerely yours,
Theodore Roosevelt

THE MOUNTAINOUS slopes above the Water Baron's mansion were pale green; the rich substance of saplings' spring buds reflecting the light of early dawn. The vigorous trees seemed lacy, for they had only five years' growth, planted on the slopes by foresters after the loggers had felled the ripe timber. The tip of the microwave transmitting tower of the RECOM system glittered as the sun rose. Once it was rivaled by tall forest, now it stood as lone sentry over the mansion. The down valley slopes, across the graded road which forked up to the ridge and down to Calib's dam, were still covered with mature forest; dark and dense in its depths but capped with delicate green buds. A silver monorail track sliced through the heavy forest, easing its way down slope to Calib's dam and the small support settlement there, then running straight through the verdant valley. A whitewater river serpentine near the track, disappearing far down valley into early spring haze. The brimming reservoir which supplied the river water still held an early morning fog close to its surface and the haze muted the brilliance of Calib's dam at the water's southern edge. Almost anyone in the vicinity of the Water Baron's mansion could see and marvel at the pastoral scene, but Erik could not.

Erik sat in the uppermost branches of a sturdy spiral oak growing along the road that passed his father's mansion. From his perch he could see the mansion's broad front face. Normally he could see the front porch and identify family and contractors who entered and exited through the huge portals. Today, as for the past week, he could not identify more than the mansion's monolithic shape rising from a hazy green and gold plane of lawn, for he wore a light-tight patch over his good eye and the other eye had a light-tight dead spot in its center. Peripheral vision of a single eye was not sufficient to identify distant details. Still he watched, and when he saw a white speck bobbing against the backdrop of the mansion, his mind filled in what his eye could not. White, almost assuredly the speck was white, rapidly moving away from the mansion. The color alone was enough to narrow down the speck's identification. His mother, Beth, tended to wear desert colors, brown, golds and hazy blues, and Pola, his sister, liked Earth tones, greens and bright blues. The speck could not be Hilde or Marc: No one would put either of the roughnecked youngsters in white, for it just wouldn't stay white for long. Aram, his father, might wear white; Aram seemed unaware of the clothes he wore. If someone put white in his wardrobe, he was likely to wear it one day, especially on a warm day as this one was getting to be. Or the white speck could be Alexi, his older brother, on his way to the dam or the power shack on the ridge.

Erik waited. The white speck enlarged, then blended with the light flagstone path leading from the mansion to the road. Soon there was enough white protrusion into the surrounding turf for a white gorilla shadow. No one but Alexi could fill a shape that large. Erik edged his way back to the tree trunk, shinned and stretched to lower himself. Erik's reach was not overly long but his hands and legs were sure from recent years of boyhood experience. At the lowest limb, he crouched so that he could see portions of the road through the thickly-leaved branches. The white-suited figure was striding down the road now and was close enough for Erik to see Alexi's dark, tangled hair and the

Cynthia Felice

LONGSHANKS

Only ten days ago, as their ship orbited Serensunar, these people had been awakened from a fifteen year sleep and told there was no room for colonists. . .



sparkling gray eyes, squinting in sunlight and then relaxing as Alexi passed into the spiral oak's shade. Erik dropped to the road, landing with a solid *umpf*.

Erik looked up to see Alexi prepared to attack. "Peace, brother," Erik said hastily. Alexi straightened, shaking his head as he glanced at the tree, wondering no doubt if Erik had hidden cohorts there to leap at his next unsuspecting step. It was a game they had played when they were young, a game Erik still considered fun from time to time.

Alexi, satisfied that he was not the object of attack-real or mock-relaxed. "They're waiting for you to come downstairs," he said nodding toward the house.

"I thought as much. That's why I got up early and came out here to wait for you."

Alexi's thick bushy brow raised suspiciously. "Why?" He glanced back up into the tree.

"I want to know what they're going to say."

"Go ask them." Alexi started to walk again but Erik stepped in front of him. Alexi stopped and stared down at his brother.

Erik tried to meet his gaze, but the single eye would not co-operate and there was only black where Alexi's face should have been. "You tell me," he said. "You know I won't last five minutes in the same room with Father."

"Mother is there too."

"Then Aram won't say everything that's on his mind... come on, Alexi. What have they decided?"

Erik knew his brother was watching him closely, trying to determine if it was fair to interfere with Beth's and Aram's plans by discussing the matter with Erik before their parents did. He no doubt finally agreed that Erik and Aram could not have a satisfactory meeting, for he went to the roadside and sat down in the grass for a leisurely talk. Erik followed.

"They're going to extend your juvenile status for a year. They think it will take at least that long for you to make minimum grades on the computer because until you regain vision in that eye you can't see well enough to study...and, of course, there's also your reputation for not studying."

"It's just an excuse," Erik said. He expected Alexi to protest, expanding on the tentative reasons Beth and Aram had already given. Erik had heard the entire argument—that it was unreasonable for Erik to think he'd achieve a decent adult status contract while half-blind, and, since there was a doubly legitimate reason for extending juvenile status past his sixteenth birthday just two weeks hence—the computer grading system had judged him as immature and as lacking minimal contract readiness—he should take advantage of the extra year (two if necessary) to catch up on his academic training and regain his vision in the bad eye as well.

But Alexi said, "Yes. It probably is."

"What do you mean?" Erik could not help the question. Alexi was his father's man, the chosen heir. Even though Alexi had a hair-trigger temper, he was able to get along better with Aram than most other men because father and son usually saw matters as if with one head.

"The reasons are all correct, but underneath, he's too protective of his family. Look at Pola. She's had adult status for two years but he won't let her take a contract with Research City. It would mean she'd go away, and Father likes his family close by."

"Pola will go. She'll wear him down with all her reasonable arguments and he'll finally have to let her go."

Alexi nodded. "Perhaps that's what you should do."

"I'm not Pola. I can't let him chant for an hour and then calmly counterpoint like a computer as Pola does. And I'm not like you. I can't drown his arguments by mere loudness of my voice."

"I don't need to argue with him very often," Alexi said, smiling at Erik. "He's really a very brilliant man, you know. He does things well, if you'd only take the time to notice."

"I know that. But try seeing it from my point of view. Why should I continue my education? You're the heir. The Empire doesn't need me."

"For your own good, you should at least complete minimal standards. It's not so hard. Pola and I were finished before we were fifteen and if you'd spend time in the computer room instead of roaming around the countryside, you'd be done in less than a year. What's a year?"

"Too long to waste on something I neither want or need. I'm not the heir."

"You keep saying that, but I've never heard any official declaration. If you'd show an interest there could be two heirs...or more."

Erik sighed. He knew Pola was not interested in the interfacing or dictatorial functions Aram and Alexi performed though she was deeply involved with certain aspects which Aram considered a valuable contribution. She was dissatisfied with the kinds of applied research opportunities of Aram's Empire and wanted to go to Research City to join one of the new programs available there, or better yet, start her own. With her singlemindedness, Erik knew Pola would eventually have her way and there would be no wave in her wake when she did. Aram would be mollified, Beth resigned, and Alexi left as heir, for, though there were still two very young children in the family whose ambitions could not be anticipated yet, by the time they grew up, Alexi would be firmly established as Aram's successor. Erik was certain in his own mind that he wanted no part of the confining life required of the Empire's dictator.

"Erik, between us we could make this Empire into something Aram never dreamed of."

Erik held up a protesting hand. "One heir is enough. You're it. I never wanted it. I don't even want a part of it. I want *out*. There's plenty of room for more empires to be made on a planet which has been settled for only eighty years. There's more to see than just this Empire or even the coast."

Erik couldn't bear the thought of a whole world waiting while he sat within his father's borders. Alexi just didn't share his wonder. Once he'd seen the barony, being his father's heir, as a means to conquer the world. Now Alexi was older, more realistic, and he'd modified his world-encompassing dreams to certain futures for the Empire. Alexi's gray eyes seemed compassionate as they gazed into Erik's. The single blue eye was probably glittering and if the other were unpatched the pair would nearly burn with desire. Erik couldn't shake loose of his dreams, wouldn't

Alexi sighed. "Aram will hold you back for a year, but under the circumstances I think he's justified," he said.

"I won't let him. I'll have to run."

"What?" Alexi gave him a startled look. "That's infantile. You can't run away from your problems."

"I'm left with no reasonable alternative. There's no other solution."

"The alternative is reasonable. Finish your education

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and get that eye straightened out at the same time. There is no shame in it. Half the males on the planet don't take adult status until they're seventeen or eighteen."

"Nol! The educational standards are for people who want to be a part of the Water Baron's Empire or want to go to Research City. I fit neither category."

"There are no other categories, . .unless you want to farm. I believe you have the minimal standards for lubricating field tenders but I can't picture you staying on ten acres of land for the rest of your life."

"I can't either. But you see, that's the problem with you and Aram. Neither of you can see a future without the Empire. What about the rest of the planet?"

"With all the refugees pouring in from Earth, what about it? Until Father builds more dams every drop of Empire water is spoken for. You need Aram's water and Aram's power to turn barren land into tillable soil. This planet is desert and rock."

"There are springs in some places." Alexi's blink dismissed springs indifferently. "And hydroelectric power is not the only kind of power."

"Hal! They're burning up petroleum on the coast so fast that there won't be anything but hydroelectric power in another fifty years."

"What about new oil fields?"

"How will *you* find them unless you specialize in geology?"

"Hire someone."

Alexi snorted. "What will you contract with?"

"Ten acres of prime land, deeded to me by my father at my birth."

"Ten acres is not likely to bind contracts as ambitious as the one Aram let for oil exploration."

Erik shrugged. "There're other sources. Wind, solar, geothermal. A little ingenuity and I might put the Water Baron out of business."

"Pipe dreams, Erik. You can't compete with him."

Erik sighed. "I don't plan to try."

"You can't run. Your father is the Water Baron. You couldn't get fifty kilometers without being recognized and hauled back."

Erik shrugged. "I'll just run again. He can't keep me tied up."

"He could put you on an outpost with ten tough people to watch you."

"Wouldn't serve his purpose. I might like an outpost and I don't think there's any educational computer extensions in any of them."

Alexi stood up and kicked a clod of dirt with his boot. It shattered, but a stone shot straight out across the road and ricocheted off a tree. "Where can you go with one lousy eye? You've everything to gain by staying. You must realize you owe him something."

"No!" Erik saw Alexi's fist clench and knew it was time to back off. "But I'll think about it, Alexi." The white knuckles eased a bit as Erik backed away. Alexi had learned to control his fist-swinging impulse quite well these last few years because he finally met citizens who could match him blow for blow. Erik could not and even when his slight frame filled out over the next few years he would still not be a match for Alexi. But what Erik didn't have in brawn he made up for in wit. Alexi had been difficult to master in brains too, but paying the consequences of Alexi's steel

fists had made Erik a brilliant student of his brother's character. Alexi could argue just so long before his voice grew loud and his hands clenched. Finally, he'd swing. He might not be right, but he gained tremendous personal satisfaction out of a good fight. But Alexi couldn't fight passivity. Whoever could remain passive or feign passivity when Alexi was angry was the person in control. Erik was now in control. "As you say, Alexi, I will consider my alternatives."

"There's only one reasonable one."

"You're probably right. Well, thanks for the information."

Erik walked up the road as if he were going to the mansion. Without turning he could feel Alexi's eyes burning holes in his back. He'd be wondering whether to mention this conversation to Aram and Beth, especially to Beth, for her intercession was often the only way to avoid Aram's wrath. Yet Alexi would know that Erik, despite his impulsive nature, would be most likely to take the easiest way out which, in this case, would appear to be conceding to their parents' wishes. Alexi would not make a decision immediately. He'd brood over the discussion until nightfall or until morning at the latest, when the family was certain that Erik was gone. Then he'd tell his parents.

When Erik reached the place where the stone path intersected the road, he stopped and looked back at Alexi. His brother was again a white shadow moving in a blurred background. Intellectual cross references told Erik the road turned. Momentarily Alexi was out of sight. To be certain, Erik peeled back the patch on his good eye, blinked in the sunlight and looked again. Alexi was gone. Erik looked up at the mansion which stood so mightily on the mountain slope. He liked the house. He loved the people in it. But he was an alien in their midst. Erik pocketed the eye-patch and walked across the road to the woods, striking quickly and steadily for the glen where he'd left his packboard.

WITHOUT UNSEEN BRANCHES to hamper him, Erik made good time across his father's land. To his knowledge, no one particularly cared that the glen was the loveliest area on the mountain slope. It was deep within harvest-ready forests of fine timber which no one in the Empire needed yet. Foresters passed through it at least twice a year, checking for disease and pests, but picnickers preferred the reservoir's open recreation areas and hikers the higher and more rugged slopes. There was a faint trail, worn mostly by himself and his friends, but Erik kept far upslope of it.

"Toowee! Toowee!" He heard a deer clattering away as his approach was heralded by a bird. As it took wing, Erik recognized the bright plumes of a migratory marsh bird, not often seen this far north of its nesting valley. What a sight! Yesterday he could not have seen the colorful feathers arcing over the treetops as the bird banked on swept-back wings. Then the bird was gone but the vision of it as a pendant in the sky was forever in his memory.

The glen was empty. He hadn't expected to meet even his friends at this early hour. Taking off the heavy, long-sleeved shirt he'd worn since before dawn, Erik sat next to his packboard and reached into the pack for a lighter shirt. It was impossible to reach one without first removing his extra socks and raincoat, and he found himself refolding half his wardrobe. It was scant but durable. The Water

Baron, luckily, provided his family with the finest clothing for all occasions. Unwittingly, this included the occasion of running away from home.

When the pack was rearranged and the lighter shirt was covering his torso, Erik slipped his arms through the pack-board's straps. But he lay there, testing his weight against the pack, not quite willing to leave the glen. Sunshine streamed through branches and warmed ferns and leaves that were still dew covered. Tiny lips of early pink sunflowers were opening to suck in the rays. Sometimes a shadow crossed the sun's shafts: a bird settling on a branch was the cause. He was glad to see it all after a week of the tormenting half-vision of the bad eye. It didn't disturb him that the eye's full use would be forever lost by foregoing therapy. He'd never even realized it was fading on him and the loss had not really caused any functional damage. He'd already learned to compensate for depth perception though not consciously. It was something his brain had done for him, without asking or telling. The bad eye had pulled a few degrees toward his nose, not so much that anyone could notice, least of all Erik himself who rarely looked in mirrors. It had caused double vision—so the physician said, though for the life of him, Erik could not remember seeing double at any time. And somehow, the brain had dimmed the eye that wouldn't focus in tandem with the other. To bring back the eye would have required patching the good eye for months, perhaps for a year or more, and even then the odds were no more than fifty-fifty that the patch would do its job. But if it did, and the bad eye began focusing again, there was only another fifty-fifty chance that it would stay corrected. Erik felt he had a small chance of regaining something he'd never known he'd lost. A year was too long to devote to something he didn't need.

Aram and Beth had not agreed to Erik's request to forego therapy and somehow the patch had become involved in the real problems:

"Not wear the patch?" Aram had stared at Erik as if he'd gone mad. "Didn't you understand what the physician told you?"

"Yes, but..." Erik made an appealing glance to Beth as she looked up from two year old Marc who was straddling her knees. Beth's brow was furrowed and Erik could not tell if her frown was for himself, Aram or little Marc from whose sticky fingers she was disentangling a lock of long blonde hair.

Aram didn't wait for Erik to continue. "By wearing the patch you'll regain your vision," he said, repeating only in part what the doctor had said.

Aram considered the unmentioned context of odds as something to be essayed, not circumnavigated. Eric wished he could share his father's positive attitude. "I wanted to take a contract this year...an adult status contract."

Aram snorted. "With your good eye patched you'll be half-blind. Responsible contractors won't risk giving you even an unskilled contract and, since your sight loss is only temporary, computer training for the blind would be wasted."

"I know," Erik said. "That's why I want to forego the patch."

"That's unnecessary, Erik," his mother said, pushing her hair behind her ears and patting Marc's hands to keep them busy and away from her hair. "We'll extend your juvenile status for another year or for however long you must wear

the patch. Aram's programmed our education computer extension to work with your partial vision until you can read the printouts again."

"But..." Erik fell silent, for Aram was glowering.

"Recently I've heard you speak of maturity as if it were a quality you possessed. I'd be willing to believe you if you'd stop talking about maturity and started demonstrating it. Wearing the patch and accepting the inevitability of juvenile status—and making the most of it—is the only mature decision."

Heartsick, Erik had left the room. Aram's and Beth's decision did not seem the only alternative to Erik. Erik wanted his adult status and he wanted to direct his own life. Now! The solution was simple. Forget the patch. He could see everything in the world that he wanted to see with one, bright, reliable eye. And he could see it now. There was no reason to delay another year. If he didn't hurry, he'd never cram into one lifetime all that he wanted to do.

He got up. The pack was extremely heavy for he'd packed his winter gear in fear of being a fugitive within his father's Empire for not only the summer and fall, but winter too. He hoped Aram would simply wash his hands of his second son when he learned Erik had run away. But there were Beth's pleas to consider. She could turn her husband's will when no other human on Serensunar could, and the Baron's forces, focused on finding one well-known sixteen year old boy would be difficult to evade. Alexi was right. He could not get fifty kilometers without being found, but if he could just make ten, to Red Rock Pass where the Earth refugees were crossing Aram's land on their way to the coast in groups of five hundred, Erik would have a very real chance of leaving the Empire undetected.

Beth, though she was most like Erik in nature, would be the last to see that Erik would have his way in the end. Her biggest concern would be Aram's feelings. Yet despite Beth's pleas, Aram might not pursue him at all once Aram heard Alexi repeat Erik's promise to run again and again. Aram did not like exercises in futility. Aram had a myopic view of the world but he genuinely felt he did what was best for everyone, his family and the Empire. It probably had to do with having exercised tremendous power since he was a very young man and having been lucky—and wise, Erik grudgingly admitted to himself—to make a lot of right decisions. When he made a wrong one, he suffered a great deal, for he was a conscientious man and a loving man. He'd demonstrated his love for his family year in and year out, and that same great love poured over onto his Empire. Erik recognized it, never once tried to convince himself that his father did not love him, for to do that would be to lie to himself. But Aram saw the world from his own eyes while Erik's eyes went beyond. Erik might be a dreamer, or he might be a visionary, but whatever he was, he was going to be it for himself.

One foot before the other, placed with determination despite the wish to set down a heavy pack and find relief from the hot mountain sun in a cool stream, can put a lot of kilometers between a mansion and a boy.



HE MONORAIL would have had him at Red Rock in an hour. An electric car would have made it in three. Even walking the winding mountainous dirt road would have put him in the pass at noon the

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next day, but Erik had gone cross-country avoiding the few closely settled areas that passed for towns in the mountains and he gave wide breadth to the two other mansions and their busy estates which were between Calib's dam and the pass. He stayed above the cross-country trails lest a forester see him and he stayed below timberline and out of lush meadows. Days passed into the double-mooned nights. By the fourth day he'd reached the rim of Red Rock Pass on his circuitous route, exhausted, with blistered shoulders, but undetected. He had a birds-eye view into the plains beyond the pass and an equally fine view over the range he'd trekked. He should have enough warning to hide if searchers came his way.

He made a hasty camp beneath an overhanging rock, and settled in. There was water nearby in an unmelted snow patch which was protected by shadow. The breeze was cold and steady from the plains. His light shirt was not warm enough, not to mention sweat stained, to continue wearing now that he'd stopped walking. He removed it, put healing lotion on the broken blisters and sore shoulders, wishing for the thousandth time he'd thought to make preliminary forays with full pack to toughen up his skin. He was the only person he knew whose shoulders rebelled against a pack. His feet were not blistered, not even sore. Walking was a part of Serensunar's life, but backpacking Erik avoided if there were a car or monorail on which to hitch a ride. He was expert at making distances by commercial conveyance, rarely carrying food or supplies, for there were a thousand mansions where he could ask food or a night's shelter, and he never hesitated to do so. Beth and Aram would get a call over the visor-phone from his host or hostess to advise them their son was safe from the elements for the night. The next day there would be some degree of fuss about lost computer study time, the neglect he flaunted by not advising anyone of his plans beforehand. They were unable to understand that he never left the mansion with the idea of being gone for the night. His plans were subject to impulses, causing him to wander farther than one planetary rotation could light. It was something he was supposed to grow out of, but Erik was sure it had nothing to do with growth.

After putting on a heavier shirt, he chewed dried meat and looked out over the plains with his binoculars. There was a space shuttle craft well into the plains, but he could see no sign of people. He wasn't certain he would be able to distinguish human forms at this great distance, but even if he were unable to see them because the shuttle was waiting for favorable take-off conditions and its five hundred passengers had already trekked through the pass, another would be down within the week. Erik's provisions were ample to wait for the next group. When he saw them approach the pass, he'd climb down from the high-altitude perch, meet them halfway up the pass and continue with them, lost in their midst. In this manner he would leave his father's Empire.

The next morning, the shuttle in the plains lifted and disappeared into the bright, clear morning sky. Within the hour another ship—he knew it had to be another, for orbiting and docking with the huge transports was simply not accomplished in an hour—landed in the black, scorched place the other had vacated. The day passed slowly for him. He could not see a line of refugees. Night came and he watched the moon-lighted prairies. Most foresters would

Cynthia Felice

happily walk after second moonrise, for the huge Hunter Moon made a pleasant light without sun-heat to dehydrate. But the refugees were apparently waiting for morning's light, for Erik saw nothing. Finally he put down the binoculars, curled up in his sleeping bag and went to sleep.

The sun, rising out of the plains, should have awakened him at first light, but instinctively Erik had turned his face to the rock shadow and slept blithely until the sun was full-morning high. When he did awaken, he cursed, for the refugees were already in the pass. He dressed hurriedly and chewed meat and drank icy cold water while he carefully surveyed the mountainsides. Still no trackers. Then he shouldered his pack, groaning loudly at the pain from the still sensitive blisters and started downslope.

He had hoped to be waiting at the pass summit, and had rehearsed a cheerful greeting and anecdotal explanation for the refugee leader who would be at the head of the long file. But the first of the walkers were already over the summit, and his trail would intersect the kilometer-long line somewhere in its middle. The double time to catch up to the front people suddenly seemed of dubious value, for, as he closed the distance to the trail, hardly a head looked up to note his approach. The refugees moved slowly with their small bundles on their backs. At any given time, almost half were standing still in their tracks or sitting by the trail's edge, trying to breathe deeply enough to satisfy their lungs. Erik was slightly taken aback. Two years ago he had watched the colonial debarcations at Spaceport. He and Alexi had mingled with the Earth people seeking out likely Empire settlers, issuing invitations to people whose skills were useful to the Empire. On the basis of a few minutes of conversation they offered free transportation and one year's credit at the Water Baron's expense (with certain limitations spelled out in a short-term contract) just to get the cream of the crop across the desert to the mountains. The colonists were ambitious and, even though a bit haggard from the effects of the fifteen year cold-sleep, they seemed a robust lot. And this was how Beth, who had been a colonist herself, had always described them. But shortly after Erik's visit to Spaceport, the Research City computer had discontinued immigration, declaring the coastal lands populated to capacity. Nothing could make the computers open the spaceport again until data indicated there would be tillable land, water to irrigate it and power sources to develop it for new settlers who had to be assured a reasonable living standard without sacrifice to the established population. Unfortunately, closing Spaceport did not stop the shiploads of refugees already enroute from Earth. They would continue to arrive for at least fifteen years more that Erik knew of.

Circumventing the regimentation of the Research City computer, shuttles set down in the plains east of Aram's Empire. He accepted thousands, regardless of qualifications. Later, he too agreed with the computers. His Empire was saturated. Still it was not the end of the refugees. Though Aram refused to accept them, established refugees along the coast who were thankful they had preceded the cut-offs, felt an obligation to help their fellow Earthmen. They opened their doors to the refugees, agreed to accept half-contract and double their number. Spaceport remained closed. Lowering one's own sustenance was a personal decision but the computer would not recognise it as a reasonable alternative for every man, woman and child on Serensunar.

sunar. A certain standard of living had been programmed into the computer and it could not be met on half-contracts. Aram was not one to limit someone else's charity, and being a charitable man himself, he allowed the refugees to pass through his mountains. Whenever possible, they were conveyed to the coast by monorail and Aram absorbed the inconvenience and the cost from his own pocket. But he strictly forbade any refugee to linger within the Empire.

Erik knew all this, yet he had forgotten for the moment because his memories sought the glittering space travelers that he had met and the glamorous people his mother often alluded to in tales of her travels before she'd met Aram. Now Erik revised his assessments. Only ten days ago as their ship orbited Serensunar, these people had been wakened from a fifteen year sleep and told there was no room for colonists on Serensunar but if they could pass the formidable mountains, there were charitable hands along the coast waiting to accept refugees. Their bodies were ill-prepared for such a journey. They should have enjoyed a two week recuperation period in Spaceport, instead they faced an immediate twenty kilometer journey with a two thousand meter altitude gain to reach the monorail head. Their lungs were still accustomed to sea-level. They gasped, cried tearlessly and didn't notice one strong, tanned and healthy young man join their number. Erik slowed his pace and walked along.

Erik looked at the faces of defeated men and women, wondering if they would recover and ever resemble the eager colonists he remembered. Was the shock so great that they could not think beyond this small part of their journey? They cared enough to walk, but not enough to marvel at the land they passed through. How could anyone help but lift their eyes and turn their heads? But the people who'd given at least a sidelong glance at him did not look again, only looked at the ground where they must place their feet.

Erik quickened his pace when he did see one man look up to the escarpment above them and then glance out at the valley below. He caught up to the man and walked abreast for a moment. The man was of moderate build, dark-haired and dark-complexioned. His eyes were watery brown. There were lines in the man's face, creases which would disappear when the full effects of the cold-sleep wore off. Mentally erasing the lines, Erik placed the man at about thirty years Terran reckoning.

"Beautiful country," Erik said to him.

"Fuckin' Baron land," the man said and he spat in the wayside.

Erik hesitated. The expletive suited Aram, but somehow Erik knew there was more meaning to the word than the usual definition. "Doesn't make it any less beautiful."

The man glared at Erik, eyeing his tanned face, native clothing and huge packboard. "You're one of the bastard's smug citizens."

The words were said with such scorn that Erik almost dropped back. Aram was definitely not a bastard. His birth had been registered with the computer within five minutes of his first cry yet Erik was certain Aram was the bastard the man referred to. As for smug citizen, it was probably correct. There were few people in any other part of Serensunar who enjoyed more self-satisfaction than Aram's contractors. Cautious and shrewd, Erik disclaimed the Empire and certainly his birthright, which he hadn't

planned to mention anyhow. "No, I'm a refugee."

The man glanced at Erik again and would have snorted but seemed unwilling to waste his strength.

"I arrived last winter," Erik added hastily, "Took a contract in a lumber mill." He jerked his head upslope toward the escarpment.

The man looked up, his eyes searching the horizon. "Thought the bastard didn't 'low no refugees on his precious land."

Erik shrugged. "I didn't get caught, for a while."

Now the man snorted. "Kicked you out, eh?"

Erik nodded, sadly. "But at least I've something to show for my trouble." He gestured to his pack.

"Fucking bastard's made of stone. Population of less than one person per ten square miles, even less in his southern lands, and he says he's *saturated*. Down on the coast they're already at twenty five per square mile but his Empire is *saturated*." The man shook his head.

In the face of such vehemence, it seemed futile to explain that a suddenly increased population would force the Water Baron to renege on privileges and certain rights he'd promised in firm contracts to Empire citizens. Instead Erik said, "My name is Erik."

"Angelo Ferrino," the man said.

"Do I call you Angelo? Or Ferrino?"

"Angelo," he said. "What's your last name, kid?"

"Doesn't matter. They don't use them here...not even on the coast. I chose Erik."

"Don't understand it," Angelo said. "How do they keep track of everyone if they don't have a last name or even a number to keep all the Eriks and all the Angelos straight? Back on Earth we all had numbers. I've known mine since I was ten years old. We get here and they tell us to forget it, pick one name cause the other will never be used again. How do they do that? Tell me!"

"Your signature will be recorded with Research City's computer. There's only one Angelo who will write Angelo the way you do. It eliminates the depersonalization of a number."

"So now I'm just Angelo. Just like that they wipe out my family name and everything it stood for."

"The only thing that matters on Serensunar is you are Angelo who fulfills contracts on time and meets specifications without exception, or you are Angelo who requires extensions, amendments or, worse, reneges. You are whatever you make of yourself. Reputation means a lot here. You can get material contracts on your word if your reputation backs you up."

"My word is enough. Angelo Ferrino has always been as good as his word."

"Your word's fine as long as the computer backs you up."

"Nobody trusts nobody here."

Erik shrugged. "Actually, everyone trusts everyone. Who'd dare lie?"

Angelo looked sharply at Erik for a moment, then he grinned, threw back his head and laughed. "Right. Who'd dare lie. Maybe not so stupid after all. Maybe, just maybe."

Someone up ahead heard the laughter and stepped out of line until Erik and Angelo drew abreast. Angelo grabbed the man's arm and pulled him along. "Erik, this is my cousin, Salvatore. We call him Sam."

"Hi, Sam."

Sam nodded to Erik and then looked at Angelo. "Hey, uglier than me, what did you find to laugh at on this forsaken world?"

Angelo shrugged. "Not so sure it would be funny the second time around. Wasn't even the first, I'm just hysterical. But maybe this world got a little sunshine, after all." Sam winked at his cousin. "We can at least get suntanned like the kid."

"That's all I want. I don't care about my pale skin, but I want sunshine to make my grapes grow. When they grow, I feel good."

"Grapes?" Erik knew what grapes were, but he didn't understand the interest in growing thorny clusters of sour purple fruit.

Sam whispered, "Smuggled seed from my farm in California. Paid a fortune to an officer to carry them on board. The variety has been carefully cultivated by my family just for this journey. When I find good grape-land, I will have bearing vines first season. The following year, I will have the finest wine Serensunar has ever known."

Erik remembered then that Beth had often mentioned an unsatisfied taste for Earth intoxicants. Wine was among the ones she had mentioned. He knew now that the drink Sam mentioned belonged in the category of cider and whiskey. "I hope you find just the right place," he said, politely.

Angelo shook his head in disgust. "They told us there's no land left along the coast. Every inch is taken. No place to grow grapes...and the fuckin' Baron won't let us into his mountains either."

"Maybe it's *too* cold in the mountains anyhow," Sam said. "Grapes, these grapes are a good, hearty strain. But it shouldn't be *too* cold."

Erik nodded. Sam took the nod for interest and he continued talking. As the morning progressed, Erik found himself learning about perfect grape growing conditions and soon he was trying to remember his geography to determine just where such a place existed. Not too cold, but not humid either. Good soil which must be well drained, for grapes would not grow in mud clods. Mostly Erik just shook his head. Aram owned most of the undeveloped, fertile land on the continent but that land was promised to future generations. Still, Erik's mind continued to explore the possibilities, for Sam and Angelo had perked up considerably while describing their dream vineyard.

When the answer struck Erik, it froze in his throat. It was too right, too absolutely perfect. He examined it again. Far enough south for mild winters and certainly the land was fertile. But best of all, the Water Baron didn't own it. Generally that didn't matter, for it was the Baron who would supply electric-power, and he wouldn't do so unless his usual contract was signed. And if a man somehow got around the power necessity, Aram still had the water. But this place...this place!

Erik was grinning as he paced the two men.

Sam halted his dissertation on the merits of oak wine casks. "What's the matter, kid? You look like the cat who swallowed the canary."

"What? Oh." Erik recognized cat, for there were several varieties on Serensunar, but he did not know what a canary was. He didn't want to ask, and he sensed it was not important. "Listen, Sam, Angelo. The monorail head is just seven kilometers away and there's a computer extension there. I'm going to go on ahead and check some things with

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Research City and if I get the right answers, maybe I'll have just the place for you to plant your grapes.

Sam's eyes lit up. "Where? Tell me."

But Angelo waved him off. "Sure, kid. Give it hell."

Erik didn't want to raise false hopes, so Angelo's sour grapes were almost welcome. Yet if the data agreed with his memory, he needed these men. "Be sure to find me when you get to the monorail."

Sam smiled, half from confusion and half from exhaustion. Now he nodded, as if just remembering again how tired he was.

Erik waved and doubled his stride, passing exhausted refugees with ease. Every footstep seemed to echo, This place! This place! Soon he was abreast of the leaders; a few strong men and women doggedly putting one foot before the other, not allowing themselves to falter in the hope their perseverance was giving someone behind them strength to take another step. "It's all downhill, now," he said to them. Some eyes lighted and someone gave a hollow cheer. But Erik barely heard them. This place! Soon he outdistanced them.

AT THE BASE of the pass was old moraine and beyond that a wide but rugged canyon where the monorail track began. The rail area was dotted with extruded plastic storage huts to shelter the refugees while they waited for freight monorail cars to come and take them to the coast. The huts were all empty and the track was without a waiting car. So Erik knew the control shack should also be empty. Still, Erik approached the shack cautiously. He did not personally know the lease-holder of this station, but if there were an alert out, the lease-holder would know Erik. His heels barely sounded as he crossed the bare planked floor and he quietly opened the shack's door. The computer room stood empty. The lease-holder would know to the minute when to expect the next monorail car and probably would not come down until an hour before. He wondered if they gave special consideration to the refugees and then he shrugged. The refugees were hours behind him and Empire contractors could not afford to waste time being where they were not needed. He entered.

Erik queried the computer for wine markets, smiled when he saw there was an unsatisfied demand in Aram's Empire. First problem solved. No sense in growing grapes and making wine no one wanted to buy, but apparently his elders knew more about the subject than he did. They imported large quantities of coastal fruit flavored intoxicants and left standing orders for more and they made a lot of Greatland apple cider themselves. Satisfied he'd have a market, he asked Research City for all available data on Tarcola Springs Basin which lay far south of Red Rock Pass and also south of Aram's Empire border. The data was scant compared to what was available on other areas but there was sufficient information to know that the climate was as he remembered and the land was fertile. Then, finally, he asked for dam-maps of the area. Graphics took a few minutes, but soon he had them from Tarcola Springs Basin in the foothills up to the glacier headwaters. He almost cheered. The river running closest to the basin was undammed. Actually it was a small fork of a larger river, Big Sister, which was dammed by the Big Sister Dam. Little Sister ran parallel to Big Sister and far

to the north was another of the giant dams, Great Beth. The two dams and the too numerous to count smaller dams already existing ought to supply the necessary irrigation for the vicinity's Empire land. But to be sure, Erik queried the computer for projected water consumption over the next three generations. The computer projection was well within the capacity of the existing dams; Aram was unlikely to build a dam over Little Sister. And Aram was favoring Eastern Slope development these days, which was across the continental divide from the land Erik was interested in.

Erik folded the computer printouts, put them in his shirt and left the computer room. The refugee camp was still empty. Evening birds who were just beginning to stir made the only sounds. The sun was partially eclipsed by the western cirque wall and night would now fall fast. But Hunted Moon was already rising, and later Hunter Moon would come to chase it across the sky with its fat mellow light. Erik wondered if the refugees would continue walking after dark, wondered if they knew about the moonlight. If they did, would they be strong enough to continue to the camp tonight? Their equipment was scant for an exposed overnight stop in the pass. They had only water, food-paste and a space blanket apiece. No shelter other than rocks and there was no firewood at that high altitude.

He wandered into a large hut that was set back in the canyon's young forest. There were twenty-five cots with straw mattresses and two powerful electric heaters. Boxes of tinned food were stacked next to one entrance and a medical kit hung on a metal hook, screwed into the foamed wall, near the other entrance. There were toilets and shower cottages closer to the track, but running water had been piped into each hut. Erik unshouldered his back-board, shoved it under a center cot and flopped down on the mattress. No dust blossomed from the compression: Good straw, well aired. He took the printouts from his shirt and began reading them carefully, but the last of the sunlight faded quickly and Hunted Moon did not illuminate the hut. Strung on wires and supported by hooks were electric lights but Erik did not turn them on. Someone in the mansion might notice a solitary light and come down to investigate. Besides, he was tired.

But if he were tired, what of the refugees? He hoped they had the strength to make it to the camp tonight. They'd all be less stiff, less miserable in the morning if they slept the night in the camp Aram had provided. Bastard, he thought, fucking bastard. He should have queried the computer for Earth connotations of the expletives. He guessed they'd indicate hatred, but he wasn't sure why anyone would hate a man who'd provided food, shelter, and transportation to the coast and never asked even a promissory contract to cover the expense.

Erik was awakened by naked electric light bulbs brightly shining in his eyes. He sat up. The hut was empty. Quickly he crept to the door and looked out. All the camp huts were lighted and so were the strings of outdoor light illuminating the path to the monorail and toilet cottages but there were no people about. Hunter Moon was high in the sky so he knew it was almost midnight. He looked toward the pass and faintly detected slowly moving shadows. Apparently Aram's contractor waited until the refugees were a certain distance from the camp and turned

on a master switch. But Erik wasn't sure of what would happen next. He melted into the forest shadows to watch.

Nothing. The first of the refugees entered the hut closest to them and didn't come out. When it was filled they went into the next hut. It was slow, painfully slow, and finally they were entering the hut Erik had chosen. Still he'd not seen any of Aram's contractors. No doubt they knew these people were too exhausted to do anything but select a cot. Erik re-entered the hut when he judged it was half full. A man was sprawled over Erik's cot, not having noticed Erik's pack underneath. Erik reached for the pack and was about to select another cot when the man turned over. "Hey, kid... That one's yours."

"Angelo!"

A limp arm fell away from Angelo's eyes and his fingers almost pointed to the next cot where a refugee pack lay. "...'s my pack, your cot."

Erik smiled. "Why didn't you just take that cot?" He wasn't perturbed, just amused.

"...'s warm in here."

The night air was indeed cold, but the people didn't seem to notice. They were just falling into the cots. Some pulled their space blankets out of their packs, some didn't seem to care if they were covered or not. Angelo was not covered. Erik opened the filmy thin pack and pulled out the fleecy, silver space blanket and covered him. "Hey, Angelo. I've got good news about the grapes."

"...'s nice."

"This place is perfect."

One great brown rheumy eye opened. "Tomorrow." The eye closed and nothing else moved. No thanks for the blanket, no goodnight. Angelo could have been dead but for his breathing.

Erik sighed. He was eager to talk about grapes but Angelo was in no condition to listen. Hopefully he looked around. The hut was filled to capacity now and Erik walked down the double row of cots, checking every dark-haired man, looking for Sam. But he was not there. Erik went back to Angelo. "Where's Sam?" Angelo's cheek twitched but he did not stir. Erik sighed again, considered checking the other huts for Sam but then decided against it. He'd wait until tomorrow.

There were a few people gathered around the food boxes at the end of the hut but no one had turned on the heaters. Erik adjusted the knobs, watched the coils grow red and then turned on the blowers. He pulled the flap over the door and then went to the group gathered at the food. They seemed indecisive, looking at the labels and the great metal clips which were unmoveable by fingernails. Erik pushed his way through the group and pried up the clips with his knife. Inside were packets of fortified porridge mix and also disposable paper bowls. A woman opened a package and peered into it, puzzled. The directions were printed on each package but she didn't turn it to look. Erik took out one of the bowls and handed it to her. "Mix it with water. There is a spigot at the other end of the hut." She nodded and turned away. The others helped themselves to bowls and packages and soon they were gone from the boxes. Snores were beginning to fill the tent. The sound of running water did not disturb those who preferred rest to food. Erik closed the box and went back to his cot. Angelo slept soundlessly, his arm over his eyes. Erik lay back on his own cot and looked around.

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Movement at the door flap caught his eyes. Two Empire men entered. Erik froze. He didn't recognize either of them. Then he scrunched down in the cot.

"Excuse me, everyone. I know you're tired...please. If anyone next to you is sleeping, wake them up for just a moment, please."

Erik rolled over, reached across and shook Angelo, hard.

"What the...?"

"Baron's men. Wake up for a minute."

"Shit!" But he propped himself up on one arm. Erik kept his back to the contractors. Angelo squinted at the men, glanced suspiciously at Erik and raised an eyebrow. "They looking for you?" he whispered.

Erik shrugged.

Angelo frowned and shook his head slightly.

"Thank you," the man at the door said. "Please count off. If you have a child with you see that he or she responds or else respond for them. We need to be certain that no one has been left on the trail."

The counting began and the cadence got close to Erik. Angelo nodded at him and Erik sounded off, Angelo called the next number. The responses ended at twenty-five.

"That's all of them," one of the Empire men said. "To the head."

"Is anyone in this hut sick or injured? If so, we will aid you now."

"I have blisters," someone said.

"There's an aid kit with medication for minor abrasions. I want anyone with a broken or sprained limb, or anyone with symptomatic illness," He waited. "No one? All right then. We'll be turning out the lights here in the hut. Please follow the outside lights to the toilets. Every group is required to police the camp before they leave on the monorail, so remember, if you don't use the toilets, you're going to have to clean it! That's all, have a good night's rest."

"The blowers are already on," the other man said.

"Who turned on the heaters?"

Erik's eyes widened, but he kept silent. Angelo glanced from Erik to the contractors. "I did," he said loudly.

"No harm, sir. You did it properly, but we would prefer it if everyone will leave all equipment alone. We will be by regularly to adjust all Empire-owned power equipment."

"I can turn on a heater," Angelo growled.

"I'm sure you can, sir, but please humor us. We have fewer repairs this way."

Angelo grunted and lay down. The men slipped out of the hut and the inside lights dimmed and died. "What'll they do to you if they catch you?" Angelo whispered to Erik.

"I don't even know for sure they're looking. I don't want to find out until I'm out of the Empire."

"You steal the pack?"

"No." Erik sat up and felt in his pack for his jacket.

"Hey, what you doing?"

"You heard the man, he's got an exact head count. Since I was counted, that means someone is still on the trail."

"Huh? Oh, yeah. What you doing though?"

"Going to go back to look."

"Oh. Probably that girl."

"What girl?"

"She was walking next to me most of the day. I carried her pack some of the time, but then she took it

back and just sat down. I figured she was gonna rest a while. You didn't notice her?"

"No. When did you last see her?"

"Sundown...maybe earlier than that. She could be the one. Wanted to go back to Earth. Her father didn't wake up from the sleep. Pretty sad girl. They wouldn't take her back, of course."

"Well, I hope it's her. As slow as you people were walking, I should find her within an hour or two. Just hope it isn't someone who quit on the other side of the pass."

"She must be hiding."

"Oh great," Erik muttered.

"Yeah, must be hiding. Last people were supposed to report anyone who couldn't walk. They told us at the ship the camp people send out rescue parties but require promissory...something."

"Contracts. That's just to make sure everyone doesn't just sit down in the trail and wait for a team to fetch them. The foresters who go would never get their own work done if they had to haul dozens out every week."

"Should run a bus."

Erik shook his head. "Be glad the pass is open at all and that there's a rail to take you to the coast. One day it'll be closed."

"Bastard Water Baron," Angelo said, and he turned over in the cot.

Erik really wanted to ask Angelo about the hatred for his father and to know if it was peculiar to Angelo or general among refugees. Within the Empire, Aram was respected and well-liked. Erik didn't understand why strangers from Earth would dislike a man they'd never met. Especially one who was so generous to them.

ERIK TOOK HIS PACK from the packboard, put in food, medical packet and his sleeping bag, left everything else piled on the packboard under his cot, and quietly crept out of the hut and into the night. Hunter Moon was rapidly approaching its set, but Hunted Moon would rise again within the hour, having outfoxed the hunter for yet another night. As he walked toward the pass, he wondered if the little moon would ever be caught or if its erratic orbit would forever elude Hunter Moon.

Toughened from the cross-country escape and rested from the refugee wait, Erik's sleep-stiff muscles loosened quickly and he steadily gained altitude. He used his torch to sweep both sides of the trail and occasionally went off-trail to look behind boulders. If anyone were hiding, there wasn't a very good chance that he could find them in the night. He could be seen too easily because of the torch, though he did try to sneak around bends and flash the light over broad areas, hoping to catch the hider unaware. But as time went on he could only hope that the girl, or whoever was missing, was not really hiding.

Well up the pass, he learned that she was, indeed, hiding. But luckily she'd done a poor job of it. Far down a talus slope his light caused a glint that could only have come from metal trash or a space blanket. Trash was unlikely, but either way, he was bound to investigate. His pack was not so heavy that he would mind adding a bit of trash, but he would resent scrambling down the loose scree, and then back up, just for an empty can. With the racket he made on the slope, the popping sound of rocks colliding with one

another, he was certain it had to be trash, for in the still night the noise he made would have awakened the dead. But it didn't awaken the exhausted refugee. She'd scrunched herself behind rocks with just an end of the blanket visible. Only when Erik shone the light in her eyes did she stir. She appeared to be in her late teens. Her dirt-streaked face was etched by tears and her hair, as fine, as tousled as Hilde's after a day of hard playing, made her seem no older than his little sister.

"Are you all right?" he said when her eyes blinked and her head rolled.

She sat up. Damp earth-clung to her. "I don't want to be rescued. I won't sign a promissory contract, so you can just go away and leave me alone."

"I'm not an Empire man, there's no contract to sign. Are you all right?"

"No, but there's nothing you can do for me unless you've a space ship to take me home."

Erik sat down and set the torch on its dimmest setting. "You can't go home. Earth is dying. There's nothing for you there."

"I don't care about the living conditions as long as I can be with someone who cares...Grandmother."

"Are you the girl whose father...didn't wake up?"

Tears welled and she buried her face in her hands. Erik almost groaned. Self-pity was an alien emotion to him, but he also knew this girl had become his problem. His presence in the camp made it so. Though he knew she should be treated as an adult, he talked to her much the same as he would to Hilde when she pouted over a lost toy. "Angelo, the man you walked with today, told me about you. I know you're sad over losing your father, but you must realize that even if there were a way to return to Earth, it would solve nothing." Patronizing.

"Grandmother."

"You've been fifteen years in transport and it would be another fifteen years to return. Unless your Grandma was a very young Grandma, she's not likely to be alive." Cajoling.

"Not fair!"

She was indeed, very much like Hilde. "Hey, what's your name?"

"Megan Connelly," she said. She rubbed her face on the space blanket and looked at him. "What's yours?"

"Erik."

"Erik what?"

"Just Erik. One name is all you need on Serensunar. Did any of your family precede you?"

Megan shook her head. "Dad and I were the only ones who survived the quakes. What am I going to do without Daddy? It's not what we expected. We didn't land at Spaceport. There's no buildings or anything. I'd know what to do if everything were the way it was supposed to be. But this...This..." She gestured helplessly. "All of them were saying they wished they hadn't woken up, that Daddy was the lucky one. It's so horrible here. I'm so frightened."

"It'll seem better in daylight, after you're rested."

"We're going to live on charity," she said bitterly. "There's nothing else for us to do. They explained that before we left the ship. Daddy and I lived on dole the year before we left. We hated it. We didn't come here for that!"

"You don't have to live on charity, at least, not all of this group will," Erik said. "You remember Angelo?"

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Megan nodded.

"His cousin has grapevine seeds and we're going to start a colony a long ways south of here and make wine. We'll need people. You can be one of them."

"I'm not a farmer."

"You don't have to be."

"Dad wasn't a farmer either. He was a skilled computer technician."

"What are you?"

She hesitated a moment and then frowned. "Nothing, I guess."

"Then you're a farmer, . . . at least, for a start. Why not?"

"I suppose it would be better than charity."

"Sure. Come on. Let's get to the camp. There's a nice soft bed waiting for you."

"I can't walk any farther."

"Yes you can. You had half a night's rest and it's not really very far."

She moved to sit up, then groaned and rubbed her legs.

"They'll loosen up as soon as you start moving," Erik said.

Megan seemed doubtful but she stood. Erik retrieved her pack and blanket, added them to his own and gave her his jacket. They stumbled back upslope to the trail. Though she often faltered, Megan kept moving. There was no stubbornness nor more lamenting. She was just frightened and Erik's presence seemed to ease that. Erik suspected that earlier the fear and the tiredness had combined into an overwhelming despair. Angelo had carried her bundle, but that slender thread of friendship had broken when she dropped out of line. When she realized no one knew or cared that she was too tired to walk, she'd just curled up behind the rocks and cried herself to sleep, half hoping that, like her father, she wouldn't wake up again. Erik caught her looking at him from time to time, and she smiled when he did. Somewhere, not long before they reached the camp, Megan said, "I'm not frightened anymore, Erik. Just tired. Was it that all along?"

"Mostly." Probably very lonely too, he thought, but he didn't say that. "You can see the camp lights now," he said.

Megan nodded and her pace increased. But by the time they reached the camp, the first dawn's light was glowing at the eastern horizon. Erik led Megan through the rows of huts to the outback one and lighted her way to his cot with the torch. She lay down without a word and closed her eyes. Erik covered her with her blanket, took out his sleeping bag and spread it on the floor next to Angelo's cot, crawled in and fell asleep.

TWO FEET ON HIS BACK awakened him. "Sorry, kid. Didn't see you there. Found her, eh?"

Erik moaned softly and turned over. The hut was bright and stuffy. "What time is it?"

"How the hell should I know? Don't got no watch. Only got the clothes on my back and this silly purse they call a pack."

Erik sat up, focusing on the dust motes he could see in the slanted light rays through the open door, said: "Past noon."

"No wonder I'm so hungry," Angelo said. "Only got one little tube of paste left to eat."

"There's food in the boxes at the end of the hut, courtesy of our host, the Water Baron."

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"If I weren't hungry I'd spit on it," Angelo said. But he shrugged, walked down the row of cots and dug in the boxes. "Hey, this real meat?" He held up dried, greasy brown strips.

"Yes, it's real."

"How 'bout that," he said and he sauntered out the door.

"Hey, where are you going?"

Angelo poked his head back through the door. "Where the hell do you think I'm going after a night's sleep with dirt and dust itching in every crack?"

"Oh, shower?"

"Yeah, right after."

"Oh." Erik scratched his head and stood up. "Me too, I guess." And he went out into the blazing sunlight.

Most of the refugees had already left the huts and the line at the shower was long. The one at the toilets moved faster, and soon Erik and Angelo were in the long one, waiting for the showers.

Angelo surveyed the distance to the shower cottage. "We're gonna be here all afternoon. These people ain't had a shower in fifteen years."

Erik laughed. "Doesn't smell that bad."

Angelo grunted. "It was a creek we passed. Froze my balls off but I sure would hate to be the guy drinking downstream. Hot water's gonna feel good."

"If it lasts," Erik said, wondering how large the tanks were. "Well, as long as we have some time, here's what I wanted to show you." He pulled the computer printouts from his shirt and handed Angelo the topographical survey. "Tell me if you can grow grapes there."

Angelo squinted, glanced over the papers to Erik. "Didn't let me bring my glasses, . . . was marginal need, they said. Gotta hold the paper with my toes to read. That's marginal? Should have put my contacts in with the seeds."

Erik took the printouts, stood back and held them up. "That better?"

Angelo nodded and, still squinting, stared at the paper. After a few minutes he shrugged. "I seen better, but you gotta compromise." He looked at Erik. "We should let Sam see. He knows the grapes. I'm just the taster. . . . Jeezus, do I have a taste."

The line was moving. Angelo turned and closed the distance.

"You don't seem too excited," Erik said, disappointed with Angelo's casual attitude.

Angelo shrugged. "On the ship they told us about Serensunar, . . . that they used to let refugees make promissory notes. . . . uh, contracts, regular like. Gave them two to five years to make good. Now they don't trust us."

"That was back when refugees were called colonists."

"Colonists, refugees, doesn't matter. Now they don't trust us. No promissory contracts are allowed, so, how can we get the land?" He gestured helplessly at the printouts.

Erik pointed to a place on the map. "This land doesn't belong to anyone. It's there for the taking."

Angelo squinted and looked at Erik suspiciously. "So how come no one took it already?"

"It's just beyond Empire borders, the Baron *will* grab it in a few years. No one does anything near his borders without dealing with him. They need his water or his power to work the land even if they can secure title free of his encumbrances."

"So, you're right back where you started. Damn Baron

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still dictates the terms. We gotta have water and power for the grapes, too."

"This land is different. It has its own water and power." Erik traced Little Sister's line right into Tarota Springs Basin. "We can build a timber dam in the narrows, one of log and mud. Then we'll have water for irrigation."

"What keeps the Baron from damming Little Sister further upstream and running us out of business?"

"Nothing, except that he doesn't work that way. He doesn't need the water for his own land and he won't go to the expense of a dam just for spite."

Angelo sucked his teeth thoughtfully. "He's a mean man, that one. But say he don't. We gotta buy power from him, right?"

"Wrong. There's a natural steam geyser we can use to run generators. Later it will turn turbines."

"You mean this Baron can't touch us? I can't believe it! Ah, . . . how far from transportation? This place out in the boondocks?"

"Where? . . . by next year there will be monorail track just a few kilometers from the basin. We'll have to connect with his track or clear a road to transport grapes and wine, but if we beat him into the valley, there's nothing he can do about us."

Angelo looked down the line moving toward the shower, shook his head longingly and said, "Let's go find Sam."

Back in the hut, where only the sleeping Megan lay, Erik, Sam, and Angelo studied the computer printouts. "How'd you get hold of these?" Sam said.

"Queried the computer. Anyone can, if you know how."

"Gotta sign your life away, though."

"No. Research City has stiff requirements for running trunks and making installations, but once the contract is completed, installations are considered public domain. I used the one in the monorail station, . . . though I wouldn't care for the contractor to know that. New refugees aren't likely to know how. . . ."

Sam waved him off and patted the graphics. "Looks good, kid. I can't see anything wrong with it. How do we get there?"

Erik sighed. "That's what's wrong with it. We have to cross the Empire on Empire owned monorail, . . . that or walk a quarter of the way across the continent just outside his borders. The Water Baron won't allow refugees to cross his land unless they've legitimate contracts to cover the fare."

"And we can't get those . . . they told us on the ship. No Empire contracts available so coast people are taking half-contracts so we can live on half. That Bastard!" said Angelo.

"Maybe if we talk to him," said Sam. "He just doesn't want any burden on his land, right? If we explain our plan. . . ."

Erik shook his head. "He's not spiteful enough to dam our river once we're established, but he's not going to sit back and give you credit so you can jump his adjacent land. He might, just might, make some kind of arrangement for contract if you tell him about the seed. He likes wine. . . ."

"Screw that idea. Ain't working for no fuckin' baron. We'll walk," Angelo said.

"There might be another way. Well, there is another way. I own some land which I can mortgage to contract monorail passage. It's good land. It will bind tools and equipment

too."

"You'd do this for us?"

"For a price. I want ten percent of the gross—not of profits. Ten percent of the land too, and one out of every ten wine barrels, outright, no matter whose land they're from."

Angelo and Sam looked at each other. Sam nodded and Angelo said, "Okay. You get us there and you have a deal."

"We must register the deal on the computer, now, before we leave Red Rock Pass, then race like hell to get to Tarota Springs Basin before the Baron knows what we're up to. And if he's watching for my signature, he'll know pretty quick."

Angelo frowned. "Seems to me better to wait before you tell the computer, at least 'till we get there. 'Til then, you got our word."

"You don't understand. We can't travel by rail unless I contract the passage with my land—"

"I understand that, but if you don't register the deal, they don't have to know where we're going or why." Angelo smiled at the subterfuge.

"Once I sign my name to that computer plate, if there is a search underway, they're going to know exactly where to find me. Pretty quick, the computer will know our destination and our plans. You'd have to go on despite my detention, in hopes of reaching the basin before Empire people." Erik looked at them seriously. "They may be able to hold me for a year. They'd have to lock me in a shed or drag me in chains to a desert outpost which I don't think they'd do, but say they do hold me. I want my investment protected."

"My word's still good, even for a year," Angelo said.

"Words are easy now. But how will you feel if I show up next year after you've broken your asses in Tarota Springs? I don't think they can keep me for the year, but as you can see, I feel obliged to consider the possibility."

Angelo frowned and looked at Sam. "If you don't come along, we might fail. We don't know how to make the dam, or the power thing either."

"I haven't overlooked the dam or the generator. I'll supply you with computer printout instructions for everything. You'll manage. If you even just beat the Baron there and occupy the land, he can't evict you, and I'll be there next year. But with proper selection of people, you won't have to wait for me. No single person is that important to any venture."

"What did you do that they want you so bad?" Sam said.

"It's personal," Erik said. "Don't worry about it. Look, no one will pick up on what we're doing unless they're looking for it. I can do a good job of obscuring our destination and confusing the material contracts—I'm good at that, honestly. It's me they want, not the deal. But if they're waiting for my signature, it will be there for anyone to zero in on. If they get me, you've got to proceed and do the best you can."

"Sam, we got nothing to lose. He's putting up the front money. We just got our shirts," Angelo said.

"And my seeds," Sam said worriedly. "But, yes. We'll do it."

Erik grinned. "Good. Now, how many people will we need to start? What materials? Remember, we have to carry everything the last twenty kilometers on our backs."

"In two years I can keep a hundred people busy on that

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much land but, for now, how many can we afford to take? How do we feed them this winter?"

"Sam, you are a practical man. We'll have to forage for the winter. It can be done in that part of the country." Erik glanced at the maps and whispered. "We'll have to do a bit of poaching on the Baron's land."

Angelo grinned broadly. "Good. He's got more than he needs. Population of one person per ten square miles. Huh! He deserves a little poaching."

"Shhh, not too loud. Poaching is dealt with severely within the Empire. The vigilantes in the border areas are especially mean. Okay, let's say twenty-five people. We want carpenters and builders. Electronics people, technicians and engineers. Everyone must be strong and young. Forget infants and young children, it might get pretty rugged, but don't eliminate women. Let's see, if there happens to be someone who can back me up on the generator, that would be good."

"Maybe a farmer or two?" Sam said, staring at Erik.

"Maybe technicians with green thumbs?" Erik said. Sam nodded, realizing the preferences given to certain categories were realistic. "Now, what about material?"

"You got a pencil? I'll make a list," Sam said.

"In my pack...write on the back of this." Erik handed him the graphics.

"Hey, kid. Your girlfriend's awake." Angelo nodded toward Megan who was sitting on her cot, watching the three.

Erik winked a good morning to Megan and dug into the pack for the pencil, pulled it out and handed it to Sam. "Now remember the backpacking. Keep materials to a minimum."

"Rakes and hoes...no power machinery, right?"

"No rakes either. We can make them."

Angelo shook his head. "We make the poles, but we buy the heads. Wooden hoes break too easy."

Sam nodded and began writing.

"Hey, Erik," Angelo whispered. His eyes darted purposefully toward Megan.

Erik turned around. She was sitting, wide-eyed and forlorn, her lower lip was trembling. "You're looking better this afternoon," Erik said cheerfully, trying to avert recurrence of the night's despair. "Why don't you get something to eat? In the boxes at the end of the hut."

"There's showers and toilets outside," Angelo said to her. "You'll feel better after a shower." He scratched at his chest.

Megan's chin stopped trembling and she sighed gratefully. "Thanks." She got up and padded down to the end of the hut. The men turned back to their work.

"Thanks, Erik," Angelo said sarcastically, and then he sniggered.

"She's just scared," Erik said, eyeing Sam's growing list.

"She wants someone to take care of her and she figures it's you. If you don't want to do it, better get rid of her now."

Erik looked at Angelo. "Charity is a personal matter," he said quietly.

Angelo scowled. "If you bring her along with us, it gets to be my personal matter...Are you gonna?"

Erik shrugged. "We'll see."

When the list was very long, Erik noticed Megan had returned. Showered, she was a very appealing young woman. Wet red hair around an oval face, smooth, shiny skin,

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enormous green eyes with long dark lashes and delicately shaped brows. She sat behind Erik, listening to their disagreements on what to eliminate from the list. Presently she got up and brought each of them food, sat down and watched them eat. Angelo gave her many sidelong glances and raised his brows at Erik. Finally, Angelo stood up and turned to Megan. "Why don't you go find out if there's a rail schedule posted," he said gently.

She seemed startled. "How do I do that?"

"I don't know...nor does anyone else. Go figure it out."

She started to say something, but her mouth snapped shut and she left the hut. Erik watched her go.

"Gonna be trouble, that one. Can't figure out to go pee by herself."

"Shut up and help pare down this list. We'd need a tractor to carry all this," Erik said irritably, but he decided he'd talk to Megan soon.

THAT NIGHT when Erik returned from the shower, Angelo greeted him with a broad grin. "Got the people. Exactly twenty-five. Good, strong folk...or will be soon. Some of them even know what the hell they're getting into. I swore them to secrecy."

"Good," Erik said, pleased with the speed and enthusiasm with which the plans were being executed. But then Megan, who was sitting on her cot nearby, burst into tears and ran from the hut.

"Shit," said Angelo.

"You didn't ask her?"

Angelo frowned. "No, but I didn't mean to do that. I don't want to hurt her, but someone like that's better off on the coast. They'll take care of her there. I forgot she was sitting there. Sorry."

Erik spread the clean shirt he'd used as a towel over the end of Megan's cot to dry. "It's all right. I'll talk to her."

"Look, kid, if you decide to take her along, I'll reimburse her passage when I'm able. You got my word. I know how it is when you're young."

"You also know who holds the purse," Erik said quietly.

"Yeah, that too. So don't be mad."

"I'm not." And he wasn't. For he too, felt Megan was unsuited for the vineyard venture. Still, he owed her something for his interference in her life. He'd disrupted the ordinary course of events merely by his presence. He followed her out into the darkness. Only Hunted Moon was up but he found her, just a short distance away, beneath a tree, sniffling into her sleeve. "Megan, tears don't help," he said. His voice was gentle, ever so gentle, and as soon as he spoke he could see her try to stop crying.

"Last night...today, you talked about grapes as if I should know about them. I misunderstood. Somehow I thought I was a part of it. I see now that I am not."

"You're right, I did. Do you want to go?"

"Yes."

"Just because I'm going? Or because you want to go? Because if it's the former, you ought to know that I may not be going."

"Why?" She brushed away the last of the tears and looked at him.

Erik leaned against the tree. "It doesn't matter why, but there's a good chance I won't be there. Do you still want to go?"

"Angelo's been nice to me," she said, considering.

"He's done what he could, which wasn't much. And there will be little that he or anyone can do for you on this journey. But if you go to the coast, you'll be taken care of... by people who care."

The green eyes flashed. "You want me to go to the coast?"

"I want you to make your own decision. If you go with us, I won't carry your pack one step of the way. If you fall behind, no one will feel obliged to help you, as I did last night."

"Why did you?"

"It's too complicated to explain. Let's leave it with your knowing I was obligated to do so."

"Not because you wanted to," she said.

"No."

"Again, I misunderstood." Megan sighed and turned away from him. "My father would have gone. He wouldn't have lived on charity if there were another way. I'll go, if you'll let me."

Erik nodded. "We've selected people with special skills and knowledge. What do you know, . . . or do?"

She whirled, mouth open, about to speak, then hesitated. Finally she frowned. "Nothing. But don't think of me as useless. Consider me a blank slate."

"Oh boy." But Erik smiled over the foreboding sensation he felt. "Okay, you're a blank slate. But remember, we've nothing to lose if you can't keep up and pull your own weight."

Megan nodded, momentarily accepting his admonition meekly. She took a few steps toward the hut then stopped and looked at Erik through hard green coals. "Last night I thought you really cared about other people. But you're like everyone else on this planet—selfish and hard. I'll show all of you mean bastards there is a place for people like me. And if there isn't, I'll make one!" She turned again, not quite quickly enough to hide new tears, and ran toward the showers.

Erik watched her until she disappeared into the shadows. "First my father is a bastard, and now I am one," he muttered. "Charity is thankless. I'm glad the computer has not forced it on the world." He walked back to the hut, went in and sat on Megan's cot.

Angelo looked at him. "She coming?"

Erik nodded.

"I figured. Well, we'll manage."

"She'll be all right."

"Yeah, sure."

"Really, at least, I think she's angry enough to be." He shook his head while pondering Megan. "Angelo, she must be eighteen or so, but she says she can't do anything, doesn't know anything. Can that be?"

"Sure, . . . but then, you don't know how it was on Earth do you?"

Erik hesitated. How had it become so obvious? He'd been very careful.

"Okay, so don't tell me. But I know you're no Earthman. The kids on Earth had it worse than us older ones. The schools shut down. No education, no jobs. You probably can't imagine. Megan was lucky. Her Dad must have been some guy to swing her passage with his own . . . That, or they had lots of money. I mean *lots*."

Erik nodded. His mother had expended all her resources for passage twenty-one years ago when refugees were still

called colonists. But Beth had had a trade.

"You'd think their parents would do something at home. Some do, of course. I did." Angelo stopped for a moment. "Didn't matter in the end. A lot of them just gave up, went on the dole."

"Parents don't always make the right decisions for their children. No matter how good their intentions," Erik said.

"Yeah, I know." Angelo got up from his cot and went outside. There were people getting ready to sleep again. Erik realized he ought to, too. He climbed into the sleeping bag and tried to rest. He was aware of Angelo returning to his cot, and later, Megan to hers. He didn't try to talk to either of them even though sleep wouldn't come.

During the monorail trip through the mountains, Erik, Sam and Angelo and the twenty-five selected refugees kept together. Erik tried to tell them as much as he could about the trip before them. They memorized the monorail routes, for there would be no tickets to tell them where to transfer. The mountaineers among them studied topographical maps and Erik described the foot-trail between the last rail station and Tarcota Springs Basin as best he could recall from his single journey there with Pola and Alexi when he was only twelve. He'd queried the computer for survival data and felt he'd prepared the group quite well. Certainly Sam and Angelo were strong enough to lead the party if Aram's searchers should detect and detain Erik. But with all his heart Erik wanted to be a part of this venture.

He had sneaked into the computer room with the final supply lists and transportation plans. He contracted and sub-contracted, deliberately garbling his instructions, seemingly aimlessly, until the computer told him he'd run out of collateral. He was satisfied. All the necessary items were covered and even a good many Sam and Angelo considered luxurious. Still, at the bottom of the cryptographic contracts was his signature. If Aram were watching for it, there was nothing Erik could do but wait. First only an hour for the next southbound monorail car. And then more hours for every station where searchers might await him. As soon as essential data was passed on to his friends, Erik became silent and apprehensive. His act might be interpreted by his parents as a wish to be found despite his obscuring the true scheme and purpose. Aram would surely oblige his erring son by finding him and bringing him home and greeting him with a forgiving smile.

By the second day of southbound rail travel, Erik breathed a bit more easily, until he remembered that Aram might have people waiting in the basin—perhaps just to flaunt his might in his son's face. Erik erased the uncharitable fantasy. Aram rarely used dramatic tactics. It was more realistic to believe the Water Baron had yielded to the threat Erik had made through Alexi. He wondered if Beth would allow it.

No one came for Erik. At the southernmost monorail station, packboards and goods were waiting and the only Empire citizens about were the cargo handlers who were loading freight cars. The handlers had seen no one from outside their district for more than a week. Erik sighed. Aram could use parafolis, but that was so unlikely that it could all but be discounted. Erik believed himself free.

While he loaded his packboard, his position in Aram's eyes haunted him. Certainly there'd been little meeting of the minds—worse this last year than all the years of his life. The Water Baron did not like disruptions in his orderly life. Perhaps Aram was glad to see him gone. Or perhaps he felt

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Erik would crawl home if given enough time. If that was what he thought, Erik knew the Water Baron was wrong. He looked at his companions, all diligently arranging their pack-boards, exchanging eager words and glancing beyond the railhead where the track disappeared into the wilderness. These were the proud colonists of Spaceport. Something good would come of these people and he, Erik, would be an important part of it.

He looked for Megan and saw her sitting at Angelo's knee, duplicating his every item selection for her own pack until Angelo said something which, from his distance, Erik could not hear. Megan threw back her head and laughed, red hair shimmering like sunrise on her forehead, and then, still smiling, she removed the last item from her pack. Two days ago, laughter had suddenly become typical of Megan. After his confrontation with her in the refugee camp, Erik had expected a stoic facade as she set out to prove her worthiness to himself and the rest of the settlers. He'd planned to be gentle but firm, making her take a fair share in all the burdens. Her resentment of him was to have gradually faded and be replaced with respect for him, and she was to have acquired self-respect as she learned she was indeed a part of the group. His well-meaning plan had failed before he'd even acted on it, for she stayed as far away from Erik as she could. Whenever he saw her she was smiling and talking, and soon everyone around her would be laughing. Erik felt left out of her life, then chided himself for considering such a thing. The falling away from her was his own doing, resulting from the preoccupation he'd experienced while wondering if Aram would find him. Now, it would be different.

Erik approached her and she fled. No, he thought, she's conveying a message to those people she's joined. . . For Angelo. Erik approached her again. One slender brow raised and two green flames focused on his forehead. Bemused in her presence, he turned away. Nobody led Megan now, he realized, no one held her hand. And if they told her what to do, they did it with a smile. He hadn't suspected anything but a severe melancholic nature hidden beneath her self-pity. He wondered if she'd already cracked under the strain—he'd met some unfortunate brain-damaged people in his lifetime and many of them wore constant smiles.

Soon, Megan shouldered her packboard, went to Angelo who helped her adjust the straps, and then, with the smile still fixed on her lips, she joined the rest of the group. Erik fetched his pack and went to Angelo.

"Gonna be slow travel, kid. Damn heavy—need mules, not people."

"Mules? You mean a tractor."

"Yeah, that's what I mean." Angelo groaned under the weight of his pack as he put his arms through the straps and straightened. "Think you're clear?"

Erik nodded. "Lot of sweat over nothing. . . I'm worried about Megan."

"Nah, you were right. She's gonna be fine. I sure misjudged her. If I was thinking right I'd have looked for someone like her. Someone who can make people happy is worth their pay, even if they do nothing themselves—which ain't the case with Megan—because everyone else works twice as hard when they're laughing."

"I'm afraid she'll crack. . ." Erik stopped. Angelo was staring at him. "Well, it seems an abrupt character change."

Angelo shook his head. "None of us was in character

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when we got off that ship. Why should Megan be different? All you have to do is talk to her to know she . . ." Angelo looked up from the pack buckle he was adjusting. "She's not talking to you, right?" He grinned when Erik nodded. "It'll pass."

But it didn't pass. The heavily burdened men and women walked single file along unused monorail track which stretched for two kilometers into the wilderness. Abruptly the track ended but survey markers were plainly evident for another kilometer. Finally, the markers too gave way and there was only undisturbed grass, trees, rock, and the noise of scolding birds. The trail was taking them steadily down-slope and, though that was a blessing because of the heavy packs, their knees demanded frequent rests. But no matter, on the trail or gathered around a fallen log seat at rest times, Megan talked around Erik or through him, but never to him.

They spent most of the day walking through a loosely defined canyon which often flattened, sheared ages ago by bisecting glaciers, into meadows or woods. They camped in one of the woods, and when Erik threw down his sleeping bag near Megan's, she moved her gear to the other end of the camp. Shoulders raw again, Erik rubbed ointment and grimaced alone.

They were outside of Empire borders. When the Water Baron took new land, he speared it with a monorail, then trussed it with people, farms, logging camps, whatever. There were monorail tracks crosshatching the Empire every thirty kilometers, or as close to that figure as mountain terrain would permit. The colonists followed the path of a proposed track and continued, still down-slope, still south, beyond Empire propositions. By noon the second day they could see the vapor trails of Tarcota's steam geysers. The pace increased.

At the mouth of the basin Erik, Angelo and Sam hung back as the others walked on. They were still high enough to survey the land falling away from the mountains, from grassy, tree-dotted kilometers to distant hills on the horizon. There in the south where the hills curved toward the mountains, geysers steamed white froth into hot springtime air. Behind them, here in the north, a river fell from a truncated cliff and curved sharply north along the mountain's front range. The grass near the river was lush and green, but the more distant grass, the southern grass, was parched and yellow.

"We'll build the dam above the falls," Erik said, "and then run irrigation ditches to bring it south."

Sam looked behind them to the north along the mountain range. "Looks simpler to plant grapes there, where the water already is."

Erik shook his head. "Our power plant is there." He pointed to the geysers. "We'll winter there too, where we can tap the heat."

"Seems easier to run power lines than change a river."

Again Erik shook his head. "Changing rivers is something I know about. This one's easy. Back it up in that canyon and spill it over farther south. I'll have it done with a few weeks of blasting."

Sam nodded. "We'll divide the people—half to work on the dam and irrigation, half to clear the land for the grapes and buildings. We'll need shelter soon. It won't always be warm and dry."

"We'll need some to hunt right away too. And we must—" He stopped.

Below them the line of backpackers had slowly drifted to a halt, sensing that there were decisions to be made before further travel. In various positions of relaxation, they sat in the grass, content to look out across the huge basin or back toward the mountains. Megan was the notable exception. She'd put down her pack, taken off her boots and was moving over the grass with strange, gazelle-like leaps.

She has cracked, Erik thought but quickly realized her disciplined movements were purposeful and sequential. As he stared, Angelo and Sam went down-slope, stumbling, for their gazes were transfixed by Megan. Erik followed. Megan's arms moved like wings, but though the movements did not take her aloft, it seemed as if she were flying over the mountain turf. Her feet, no, only her toes, touched the ground rhythmically, as if each crushed blade of grass were a drum to be pounded. Her back arched, legs extended at impossible angles, she whirled. Erik was very close before he realized he was seeing a dance. It was nothing like the dances he'd seen on visor tapes. Megan's dance was heady and invigorating, full of incredible and unbelievable motion. He barely had time to sort out his responses—sensual? intellectual?—when she stopped. Her head was high, her nostrils flared and her body glistened with sweat.

There were a few feeble sounds of applause, a few encouraging comments, but mostly, curious stares. Megan didn't notice. She looked for and found Erik. Then she walked directly to him, ignoring everyone else. She stopped, put her hands on her hips and met his eyes with a cold, unflinching stare. "That is what I can do," she said, still breathing hard from the exertion.

When she turned away from him, Erik caught her hand. "I liked it, Megan. You lied when you said you could do nothing."

"I meant nothing of use to Serensunar. You people are so isolated that no one dances."

"You are one of those people now," Erik said. He touched her cheek with his fingertips but Megan only shrugged, pulled her hand free and walked away.

Erik started to follow but Sam caught his sleeve. "The very good dancers study their profession from the time they are young. It takes special dedication to make something of even a good talent. I think it must be very hard to accept a world that has no place for that talent."

Erik frowned. "She never mentioned the dance, only her father. I'm confused."

Sam looked after Megan's slender form, kneeling now beside her pack, shaking tangles from her hair. "Could you have understood about the dance? With the exception of Angelo and me, who among these people can claim their dreams are being realized in this basin? She wanted sympathy, she got it. People are usually able to extract just exactly what they need when they need it."

"She knew I'd be sympathetic because of her father?"

"You, me, everyone. Sure she knew. Maybe not consciously, but deep down, inside, she knew. With the dance she consoled all of us."

"But why did she just single me out?"

"You are of Serensunar. You are the only one who might not understand and it was most important for you to understand. She doesn't need your sympathy anymore. She wants something else from you."

Erik grinned. "She'll get it." Somehow Megan knew he was not Earthborn, and knowing she knew, her soothings of

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his anger—or was it her own?—seemed very personal to Erik. Then Erik turned to Sam. "Do the rest of them know too?"

"About you? Yes, I should think by now, each knows. We've trapped you a dozen times. You don't understand spectator sports, you don't heed the same social taboos. Oh, yes, it's obvious. We can stand shoulder to shoulder and never touch but you cannot resist touching. When you sit by me, your thigh always touches mine and you meet my eyes with such frankness. On Earth, we guard the space we consider personal. and we respect our neighbors' boundaries."

"Are they angry about my deception?"

"No. We are curious."

Sam's words were, Erik realized, an invitation for explanation. He decided that curiosity and hostility were distinctly separate. Erik didn't want to risk trading one for the other when he revealed himself as the evil Water Baron's son. Leaving Sam unanswered, he went to seek out Megan. This time she didn't flee.

IN THE GRAPE ARBORS, the most efficient work was performed during the early morning hours when the dew was still evaporating and the thick, grape-laden vines clinging to lattice strips sheltered workers from the sun. But ever since an Empire surveyor's parafoil had circled the valley many days before, an inordinate amount of time was spent leaning on hoes and scanning the sky for sight of another parafoil. Make-work was performed in the fields where the best view of the canyon's mouth was. Everyone was anxiously anticipating another visit.

By the fifth day after the sighting, Erik was becoming concerned that an arbitrary decision for the Empire monorail to circumnavigate the settlement already had been made, despite requiring great expenditure for bridges and tunnels. The thought was nearly making Erik sick, for the settlement desperately needed freight capabilities...soon. Their limping generator would not service the settlement for another winter and replacing it only headed the list of necessities.

His hoe soundly struck a rock, jarring his arms. It seemed that rocks were forever surfacing. He wondered how many he'd picked up during the year. A thousand? Ten thousand? They all looked the same to him now; he yearned for more enticing fields. The wait was double agony for Erik.

"Who is that?" Megan's voice filtered through the vines from the end of the row. Erik looked up to see her gazing toward the irrigation spillway.

Angelo and Sam, who had been working nearby, emerged from the vines with Erik, looking where Megan had pointed. Sam squinted. "Not one of our people," he said.

Even with only one eye, Erik's recognition of the visitor was instantaneous. The broad, straight back hardly bent by his pack and the long stride unaffected by the burden combined with the size could only be Alexi. "It's our contact," Erik said, grinning. Half the agony of waiting left him. "The Empire has come to us." He dropped his hoe and tossed the rock to the nearest pile and began hurrying to Alexi.

He should have guessed that Alexi would not walk into the valley from the expected direction, that he first would examine the dam across Little Sister and use the height van-

tage to make a visual examination of the settlement. He wondered how many times Alexi had circled the valley, watching the settlers at work, counting buildings and speculating on their use. It was Alexi's way. But Erik had not expected the Water Baron's heir...not after a year.

"Hey, Erik, slow down," Angelo said. He, Sam, and Megan were hurrying after Erik, trying not to run. "I swear I'm gonna cut about five inches out of them goddamned long shanks of yours." Angelo was perspiring more profusely than the morning sun could account for and his eyes were narrowed with concern.

"We should appear calm," Sam said. He was trying to tuck his tattered shirt into his pants as he glanced furtively at Alexi.

"It doesn't matter," Erik said, but he didn't wait to explain. Alexi finally believed what his eyes saw and he was waiting, grinning. Erik left his friends, running over acres to reach Alexi. Wordlessly they hugged like great bears, and soon like lovers with their hands exploring shoulders and biceps and wiping away the tears from their cheeks. Then they broke apart and stared with great, unembarrassed grins.

Finally Alexi spoke. "What are *you* doing in the midst of hard work?" He gestured toward the cottages, the greenhouses, and the neat, cultivated rows of grape arbors in the valley.

Erik sighed. "Hard work was never the problem."

Alexi seemed pleased, put his arm around Erik's shoulder, grunted because he found the breadth greater than he remembered and the height taller. They stumbled down trail together. "Why are you with these border crashers? Who are they?"

"My companions are settlers," Erik said. *They* waited, clearly perplexed by Erik's behavior towards the Empire man. Erik smiled to reassure them. It didn't work. Even at this distance Erik could see Angelo's eyes flashing angrily.

"Refugees," Alexi said, as if the word were a curse. "What are you doing here with them?"

"I had to be somewhere," Erik said easily. Then, "Did Aram send you for me?"

"You?" Alexi chuckled. "You place too much importance on yourself, brother. Aram never even let us look for you."

Erik knew Alexi didn't intend to sting him with his words, the man was born honest. "Your personal attention seems inordinate," Erik said. "Refugees!" His tone mocked.

"I was curious," Alexi said mildly. "The surveyors couldn't tell what kind of produce was being grown." He shrugged.

Honest never did mean stupid, but Erik was certain that the Empire was intrigued with the settlement, else Alexi would not have come. He wished his friends would smile. Surely they didn't suspect abandonment at this late date. He stared at them. They did! Their attempts to mask their forebodings were unsuccessful. It seemed that a year of telling them what to expect from their new world had not changed deep feelings. The Empire still equated with the onerous Earth conglomerates. Erik glanced at Alexi. He looked, somehow, like Aram; his gray eyes calm and serious, his entire attention focused on Sam, Angelo, and Megan. He halted Erik by the grip on his shoulder, completely in control, said quietly, "Introduce me to the leader."

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"Ya got your arm around him," Angelo said, unimpressed.

Alexi stared at Angelo in disbelief, then his arm dropped to his side and he stepped away from Erik, . . . room to swing in, Erik thought wildly, and he got ready to duck.

"Why?" Alexi said. Tendons were pushing against the skin of his neck, his voice was too low to be anything but angry. "If you wanted to homestead you have a perfectly fine piece of Empire land. The bother of this for the sake of an affront . . ."

"Do you think I have time to waste devising plans for the sole purpose of offending my father?"

It was plain that Alexi did consider Aram, himself, and the Empire that important, for his hand clenched. Erik knew exactly how to behave and which words to say to keep the giant from striking him, but he was not motivated to use them. His friends were confused, probably frightened, too, uncertain of how to interpret the Empire man's sudden anger. Clearly this was not the kind of confrontation they had expected.

Alexi's cheek was twitching, his face was flushed. He should have swung by now. . . . Then Erik realized his brother was controlling his anger, badly, for he was still poised for attack. Was it possible that Alexi wanted to try to understand? Erik breathed deeply. Don't count on it, he told himself.

"My land had two strikes against it," Erik said. He was standing stiffly, deliberately keeping his hands at his side, certain that the slightest provocation would be accommodated. "It was Empire land. . . ." Alexi seemed to snarl, ". . . and it would not grow grapes. This land will grow grapes."

Erik refused to let the words rush, tried not to see how white Alexi's knuckles were becoming. "We have sample wine made from grapes grown in the greenhouses last winter, our fields are nearly ready to be harvested." Alexi's eyes were still cold and hateful. "These people are refugees. I could not have brought them to Empire land, but they are too good to waste in the meaningless life the coast offers. Look, can you deny they are industrious?"

"We never denied it, Erik. But we cannot meet our existing obligations if we take in more refugees. There is just so much water on this planet and it all flows out of Empire mountains."

Erik nodded. Aram's contracts promised future generations of Empire citizens a lifestyle equal to the one their forebears enjoyed. Any refugee lucky enough to win an Empire contract assured offspring of those same privileges. "I know he's helpless in the refugee matter," Erik said evenly, "but he's helpless in the matter of this settlement, too. We are within our rights to be here. This is not Empire land."

"This isn't the first group we've found along the borders. They've been crossing the desert and settling outside the Empire, hoping Aram will deal with them just because of their presence. Most of them have floundered."

"We haven't," Erik said stubbornly. "That's why you're here, isn't it? To deal with us because you have already seen that we will not flounder." Then Erik reminded his brother, softly, "Your being here has nothing to do with me."

Alexi glanced at the refugees, his hand rhythmically opening and closing, wavering between wanting physical satisfaction for an insult to his father and himself by one

who should know better and knowing that he should get down to the business at hand. Finally he wiped his hand on the seat of his pants and nodded.

Inwardly Erik sighed. Business as usual. He had half the situation in hand. Now. . . . He turned to the settlers. "This is my brother, Alexi," he told them. "He's the Baron's representative, and his son."

Megan regained her composure faster than the two men, and there was a trace of amusement in her eyes as she stepped forward to greet Alexi. "I'm Megan," she said, hand extended. Alexi remembered the archaic greeting, for he clasped Megan's hand but was unable to resist touching her shoulder as well. She returned the gesture, knowing it well from Erik. "And this is Sam our agronomist, and Angelo our. . . flavor expert."

Sam at least had the grace to shake hands, but Angelo hooked his thumbs in his belt, backed away from the Empire man, leaving him with his hand empty. "What now, kid?" he said, looking from one brother to the other. "The troops coming tomorrow?"

Sam came to Erik's side. "We knew you weren't Earth-born, he said quietly, "but our wildest guesses didn't lead us to think. . . ."

"You owe us an explanation," Angelo said, not bothering to lower his voice nor step close to Erik.

"He owes us nothing," Megan said very calmly, "except the best deal he can make with the Empire." She looked at Erik. "Do I have it right, this time?"

Erik nodded. "I have more to protect than any other person in the valley."

"Jeez, how could I forget?" Angelo said. "Get on with it, your majesty."

Megan frowned at Angelo. "It's hot," she said. "Let's take our visitors to the kitchens and get some grape juice."

After a confused glance at Erik, Angelo, and Sam, Alexi allowed himself to be led away. Megan was unable to reach his shoulder comfortably, so she put her arm around his waist. She reached for Sam in a similar way, but he avoided her touch. Sam was too smart and level-headed to allow the breach between himself and Erik to be displayed more openly than it already had been, but he, like most of the refugees, could not abide Serenusar's ways.

"Already she's walking in the other world," Angelo said, shaking his head as he followed.

"Two worlds," Erik said, resisting the desire to touch his friend's shoulder. "Trust me, Angelo."

"Why?"

Suddenly Erik was irritated. "Because I'm the Baron's son and I don't make promises I can't keep!" Aram was worried enough to send his most important aide, but Alexi's presence also indicated he'd tolerate no careless bargains. And there was the personal matter between Erik and his family, between Erik and the Empire which might complicate any negotiations. He began wishing he'd not spoken rashly. Aram never did. He understood why Alexi preferred exchanging punches rather than words when he was angry. They were safer. Erik walked faster. Angelo matched him step for angry step.

When they were abreast of the others, Alexi looked at his brother. "You've damned Little Sister. That's Empire water." His voice was strong, the anger gone.

"You don't need it." Erik shielded the sunlight from his eyes and saw Alexi nod.

"And you have a steam energy plant, right?"

The countenance of *The Negotiator* was definitely on his brother's face. Erik could not help grinning. "Right."

"Cut us right out, didn't you?"

"Yes."

Alexi allowed himself a wry smile as he shook his head. "But you're landlocked."

"Yes," Erik said. He hoped his friends realized it was useless to deny the obvious. "And if the Baron or his son is absolutely hard-headed, they might make me eat crow on that issue. We can hardly transport our goods by air."

Alexi nodded. "We always wondered when you'd face reality."

"If the Baron's reality and mine are for once the same, we ought to be able to deal with it in a mutually profitable fashion."

Alexi grunted, and Erik could not tell if the sound meant yes or no.

"Spite is not the Baron's way," Erik said, "but I don't know how he'll feel about this pocket of independence, since it was created by me."

"It ought to make him proud," Sam said angrily.

"You have to understand that my father's world is one of perfect order," Erik said. "Everything has its proper time and place, except me."

"We need people like you," Sam said. "The one who can't fit... who just doesn't want to. The world would become static without adventurers."

"What are you two talking about?" Alexi said, bewildered. "The opposite of order is chaos. People cannot thrive in chaos."

"Yes, you're right. Aram's right," Erik said softly. "I see that so plainly when he's near. That's why I don't want to be near him anymore. But I know that I am right, too."

Erik could see that Alexi was trying to understand, and Erik was pleased that he would try. "You make me an offer for running the monorail all the way into the basin. Keep Aram out of it."

"Me make an offer?"

"Sure, why not? You conduct Aram's negotiations all the time."

Alexi chuckled. "You make an offer. See if you can make it worth my while to run a deadend rail."

Erik bristled. "You wouldn't be deadheading. We're going to expand. We'll need supplies, cultivation equipment, turbines."

"You need me," Alexi said firmly.

"That monorail is planned, right through the canyon and across this valley," Erik said, but he realized with disgust that water, energy, and land were not the Baron's only bargaining positions.

Alexi suddenly dropped his arm from Megan's shoulder and started walking toward the geyser. "Make me an offer," he called over his shoulder.

Erik stood still. He knew his brother was going to look at the tiny generator, and once he got within hearing range he'd know how desperately they needed a heat exchanger or an efficient method of removing mineral contaminants. "We'll give you passage rights through our land to the south."

The black curls swayed as Alexi shook his head, "We can go around."

"You'd have to build bridges."

Cynthia Felice

He could see Alexi nodding. "Show me what you have to lose if I don't put in the rail. The right price will come to you when you've refreshed your memory."

"Bastard," Erik muttered. "The fuckin' bastard."

"Why couldn't he go to the greenhouses?" Sam said, dismayed.

"Clear title to a fifteen meter wide strip of land." Erik had to shout, but Alexi paused. Then, thumbs in his pack straps, he turned and slowly walked back to them.

Alexi glanced toward the generator building and then looked at Erik. His eyes were sparkling. "Who maintains the rail?"

Had he been close enough? Erik wondered. Slowly he looked up and down the valley, his gaze encompassing many kilometers. Aram's maintenance contracts specified extremely high standards, time consuming standards. Reluctantly, Erik nodded. "We will."

"And the station?"

"Christ!" Erik said. The demand was not completely unreasonable, but resources were momentarily limited.

"Who?"

"It would be good to have control over our own freight operations," Sam said quietly. Angelo nodded in agreement.

Erik shoved his hands in his pockets, stared at his brother whose face showed no trace of emotion. "All right, Alexi." He waited for the next demand. If Alexi had heard the generator, there would be one, perhaps a dozen more, until there was nothing left with which to negotiate. He felt Megan's hand on his shoulder. Her flesh was like ice, but he knew her eyes would appear serene if he looked at her and that her back was straight, her shoulders thrown back, . . . as were his own, when he thought about it. Sam stood with his hands on his hips, Angelo's arms were crossed over his chest. They were sunburned and calloused from long hours of toiling in the sunlight. Their clothing showed much abuse and many repairs. They were barefoot; they were proud.

And none of it was lost on Alexi, for his brother nodded, said, "Yes," and then he hugged Erik.

"Is that binding?" Angelo said, suspiciously.

Erik nodded. It would do until the Baron signed the contracts and registers them with the Research City computer.

Angelo looked at Sam. "It sounded okay to me," and then, sheepishly, he turned to Alexi and Erik. "I always wanted to shake hands with princes."

The entire situation was in hand, and Erik's mind was racing onward. Soon, he thought, very soon. Strange that the sense of waiting was still with him. But he knew why it lingered when Megan touched him. She was a treasure in his life who could not be tucked away in some safe place nor worn around his neck. Even if he wished it were so, she would not allow it. She had taken Sam's and Angelo's hands in the Earth fashion, hugged Alexi and now Erik in Serenusnar's fashion, completely at ease with both ways. There were no conflicts in the two worlds for her.

And when Megan turned away from him, Erik knew that he'd always been free.

NOT EVEN A BREATH of wind stirred the valley. It seemed captured in a vision; perhaps it was. For even when Erik turned away from it and began walking up the canyon, his mind's eye continued to see neat rows of vines, the cluster of cottages, and *Continued on page 77*



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Soon he was fighting just to stay in the air, the fanship dancing through the glacial valleys like a leaf running rapids. The weather was playing a waiting game with his life.

CAITLEND DIDN'T HATE the storm any more than he had the man he'd just killed, but he was less indifferent to it. It wouldn't have mattered, except that his victim had been armed. Not well enough to save himself, but sufficient to make things awkward for Caitland.

Even so, the damaged fanship could easily have made it back to the Vaanland outpost, had not the freakish thunderstorm abruptly congealed from a clear blue sky. It was driving him relentlessly northward away from one of the few chicken scratches of civilization man had made on this world.

If adrenalin and muscle power could have turned the craft, Caitland would have done better than anyone. But every time it seemed he'd succeeded in wrenching the fan around to a proper course, a fresh gust would leap from the nearest thunderhead and toss the tiny vehicle ass over rotor.

He glanced upwards through the rain smeared plexidome. Only different shades of blackness differentiated the sky above. If the Styx was overhead, what lay below?

Granite talons and claws of gneiss...the empty-wild peaks of the Silver Spar Range. He'd been blown further north than he'd thought.

Time and again the winds sought to hammer the fan into the ground. Time and again he somehow managed to coax enough from the weakening engine to avoid the next ledge, the next crag, the next cliff.

No way he could get above these ice-scoured spires. Soon he was fighting just to stay in the air, the fanship dancing through the glacier valleys like a leaf running rapids. The weather was playing a waiting game with his life.

Now he was almost too tired to care. The fuel gauge hovered near empty. He'd stalled the inevitable, hoping for even a slight break in the storm, hoping for a minute's chance at a controlled landing. It seemed even that was to be denied him.

The elements had grown progressively inimical. Lightning lit the surrounding mountains in rapid-fire surreal flashes, sounded in the thin-shelled ship cabin like a million kilos of frying bacon. Adhesive rain defeated the best efforts of the wipers to keep the front of the port clear. Navigation instrumentation told him that he was surrounded by sheer rock walls on all sides.

And as the canyon he'd worked his way into narrowed still further, updrafts became downdrafts, downdrafts became sidedrafts, and sidedrafts became aeolian aberrations without names. Möbiusdrafts.

If he didn't set the fan down now, the storm would set it down for him. Better to retain a modicum of control. He pushed in on the control wheel. If he could get down in one piece, he ought to be home free.

There was a high-power self-contained homing device built into the radiocom. It would send out an automatic SOS on a private channel, to be received by an illegal station near Vaanland.

Caitland was a loyal, trusted, and highly valued employee of that station's owners. There was no doubt in his mind that once it was received by them, they would act on the emergency signal. Right now his job was to ensure they would find something worth taking back.

The fanship dipped lower. Caitland fought the wind

"Freia pulled you. Your ship is several kilometers down the canyon, and you're in a valley in the Silver Spars. The second person ever to set foot in it, matter of fact."

with words and skillful piloting. It insisted on shoving him sideways when he wanted to go up or down.

There...a place where the dense green-black mat of forest thinned briefly and the ground looked near level. Low, over, a little lower. Now hard on the stick, slipping the fan sideways, so that the jets could counteract the force of the scudding wind. Then cut power, cut more, and prepare to settle down.

A tremendous howl reverberated through the little cabin as a wall of rain-laden wind shoved like a giant's hand straight down on the fanship. Jets still roaring parallel to the ground, the fan slid earthward at a 45 degree angle.

First one blade, then a second of the double rotors hit a tree. There was a metallic snapping sound, several seconds of blurred vision...a montage of tree trunks, lightning and moss-covered earth...followed by stillness.

He waited, but the fan had definitely come to a stop. Rain pierced the shattered dome and pelted forehead and face, a wetness to match the saltier taste in his mouth. The fan had come to rest on its side. Only a single strap of the safety harness had stayed intact. It held him in the ruined cabin by his waist.

He moved to release it...slowly, because of the sharp hot pain the movements caused in the center of his chest. He coughed, spat weakly. Bits of broken tooth joined the rest of the wreckage.

His intention was to let himself down gently to a standing position. His body refused to cooperate. As the waist buckle uncoupled he fell the short distance from his seat to the shattered side of the fan. Broke...inside...he thought hazily. Rain seeped into his eyes,

blurred his vision.

Painfully he rolled over, looked down the length of the fan. The flying machine was ruined forever. Right now, the walking machine had to get away from it...There was always the chance of an explosion.

It was then he discovered he couldn't move his left leg. Lying exhausted, he tried to study the forest around him in the darkness and driving rain.

Driving rain. The fan had broken a circle in the branches overhead. It would be drier under the untouched trees...and he had to get away from the explosive residue in the fan's tanks.

It appeared to be the lower part of the leg. All right, if he couldn't walk, he could crawl. He started to get to his knees...and couldn't finish. Hurt worse than he'd first thought.

Never mind the chance of explosion...Rest was what he had to have...rest. He lay quietly in the water-soaked ruins of the fan, rain tinkling noisily off the broken plexidome and twisted metal, and listened to the wind moan and cry around him.

Moan? Cry? His head came up dizzily. There was something more than wind out there. A sharp, yes, definitely musical quaver that came from all about him. He stared into the trees, saw no one. The effort cost him another dizzy spell and he had to rest his eyes before trying again.

Nothing in the trees, no, but...something about the nearest trunk...and the one to its left...and possibly the two nearby on the other side...something he should recognize from somewhere. Too weak to raise a shielding hand, he blinked moisture away and studied the closest bough through slitted eyes.

Yes...The trunk appeared to be expanding and contracting ever so slightly, steadily. His attention shifted to its neighbors. Hints of movement were visible throughout the forest, movement unprompted by wind or rain.

Chimer trees. *Chee chimer* trees. They had to be.

But there weren't supposed to be any wild chimers left on *Chee* world, nor as many as four together anywhere, outside of the big agricultural research station.

Maybe there were even more than four. He found himself developing a feeling of excitement that almost matched the pain. If he had stumbled on a chimer forest...

Neither imagination nor intellectual prowess were Caitland's forte, but he was not an idiot. And even an idiot knew about the chimers. The finding of one tree anymore was extraordinary, to locate four together, incredible. The chance that there might be more was overwhelming.

So, finally, was the pain. He passed out.

THE FACE THAT FORMED before Caitland's eyes was a woman's, but not the one he'd been soundlessly dreaming of. The hair was gray, not blonde; the face lined, not smooth; skin wrinkled and coarse in the hollows instead of tear-polished; and the blouse was of red plaid flannel instead of silk.

Only the eyes bore any resemblance to the dream, eyes even bluer than those of the teasing sleep-wraith.

An aroma redolent of fresh-bread and steaming meats impinged on his smelling apparatus. It made his mouth water so bad it hurt. At the same time a storm of

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memories came flooding back. He tried to sit up.

Something started playing a staccato tune on his ribs with a ball-peen hammer. Falling back, he clutched at a point on his left side. Gentle but firm hands exerted pressure there. He allowed them to remove his own, set them back at his sides.

The voice was strong but not deep. It shared more with those blue blue eyes than the parchment skin. "I'm glad you're finally awake, young man. Though heaven knows you've no right to be. I'm afraid your machine is a total loss."

She stood...a straight shape of average height, slim figure, eyes, and flowing gray hair down to her waist; the things anyone would notice first.

He couldn't guess at her age. Well past sixty, though.

"Can you talk? Do you have a name? Or should I go ahead and splint your tongue along with your leg?" Caitland raised his head, moved the blankets aside and stared down at himself. His left leg was neatly splintered. It was complemented by numerous other signs of repair, most notably the acre of bandage that encircled his chest.

"Ribs," she continued. "I wasn't sure if you'd broke all of them or just most, so I didn't take any chances. The whole mess can heal together.

"I had the devil's own trying to get you here, young man. You're quite the biggest thing in the human line I've ever seen. For a while I didn't think I was going to get you on the wagon." She shook her head. "Pity that when we domesticated the horse we didn't work on giving him hands."

She paused as though expecting a reply. When Caitland remained silent she continued on as though nothing had happened.

"Well, no need to strain your brain now. My name is Naley, Katherine Naley. You can call me Katie, or Grandma." She grinned wryly. "Call me grandma and I'll put rocks in your stew." She moved to a small metal cabinet with a ceramic top on which a large closed pot sat perspiring.

"Should be ready soon."

Her attention diverted to the stove, Caitland let his gaze rove, taking stock of his surroundings. He was on a bed...much too small for him...in a small house. Instead of the expected colonial spray plastic construction, this place looked to be made of hewn stone and wood. Some observers would probably find it charming and rustic, but to Caitland it only smacked of primitiveness and lack of money.

She called back to him. "I'll answer at least one of your questions for you. You've been out for two days on that bed."

"How did I get here? Where's my fan? Where is this place?" She looked gratified.

"So you *can* talk. You got here in the wagon...Freia pulled you. Your ship is several kilometers down the canyon, and you're in a valley in the Silver Spars. The second person ever to set foot in it, matter of fact."

Caitland tried to sit up again, found it was still all he could do to turn his head towards her.

"You went out in that storm by yourself?" She nodded, watching him. "You live here alone?" Again the nod. "And you hauled me all the way...several kilometers...up here, and have been watching me for two days?"

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"Yes."

Caitland's mind was calibrated according to a certain scale of values. Within that scale decisions on any matter came easy. None of this fit anywhere, however.

"Why?" he finally asked.

She smiled...a patronizing smile that he ordinarily wouldn't have taken from anyone.

"Because you were dying, stupid, and that struck me as a waste. I don't know anything about your mind yet except that it doesn't include much on bad weather navigation, but you're fairly young and you've got an excellent body...still. And mine, mine's about shot. So I saw some possibilities. Not that I wouldn't have done the same for you if you'd been smaller than me and twenty kilos lighter. I'm just being honest with you, whoever you are."

"So where's the catch?" he wondered suspiciously. She'd been ladling something into a large bowl from the big kettle. Now she brought it over.

"In your pants, most probably, idiot. I might have expected a thank-you. No, not now...Drink this."

Caitland's temper dissolved in the first whiff of the bowl's contents. It was hot, and the first swallow of the soup-stew seared his insides like molten lead. But he finished it and asked for more.

By the fourth cup he felt transformed, was even able to sit up slightly...carefully. He considered the situation.

This old woman was no threat. She obviously knew nothing about him and wouldn't have been much of a threat if she had. His friends might not find him for some time, . . if ever, depending on the condition of the radiocom broadcaster. And just now there was the distinct possibility that representatives from the other side of the law would be desirous of his company.

He could just as soon do without that. Lawyers and cops had a way of tangling your explanations about things like self-defense.

So in many respects this looked like a fine place to stay and relax. No one would find him in the Silver Spars and there was nowhere to walk to. He leaned back into the pillow.

Then he heard the singing.

The melody was incredibly complex, the rhythm haunting. It was made of organ pipes and flutes and maudlin bassoons, mournful oboes and a steady backbeat, . . all interwoven to produce an alien serenity of sound no human orchestra could duplicate. Scattered through and around was a counterpoint of oddly metallic yet not metal bells, a quicksilver tinkling like little girl-boy laughter.

Caitland knew that sound. Everyone knew that sound. The chimer tree produced it. The chimer tree, a mature specimen of which would fetch perhaps a hundred thousand credits.

But the music that sounded around the house was wilder, stronger, far more beautiful than anything Caitland in his prosaic uncomplicated existence had ever imagined. He'd heard recordings taken from the famed chimer quartet in Geneva Garden. And he knew that only one thing could produce such an overpowering wealth of sound, . . a chimer tree forest.

But there were no more chimer forests. Those scattered about the Chee world had long since been located, transplanted tree by tree, bartered and sold in the first heady months of discovery by the initial load of colonists. And

An untouched forest... Unsoiled...Unknown to the music lovers...The music eaters..."

why not, considering the prices that were offered for them?

Chimer forests hadn't existed for nearly a hundred years, as best he could remember. And yet the sound could be of nothing else.

"That music," he murmured, entranced.

She was sitting in a chair nearby, ignoring him in favor of the thick book in her lap. He tried to get out of the bed, failed. "The music," he repeated.

"The forest, yes," she finally replied, confirming his guess. "I know what you're thinking, . . . that it's impossible, that such a thing doesn't exist anymore, . . . but it's both possible and true. The mountains have protected this forest, you see—the Silver Spars' inaccessibility, and also the fact that all the great concentrations of chimers were found far, far to the south of Holdamere. Never this far east, never this far north.

"This forest is a freak, . . . but it has survived, survived and developed in its isolation. This is a virgin forest, never cut, Mr. . ."

"Caitland, John Caitland."

"An untouched forest, Mr. Caitland. Unsoiled by the excavators of the predators, unknown to the music lovers." Her smile disappeared.

"To the music eaters, those whose desire for a musical toy in their homes destroyed the chimers."

"It's not their fault," Caitland objected, "that the chimers don't reproduce when transplanted. People will have what they want, and if there's enough money to pay for what they want, no mere law is going to prevent. . . ." He stopped. That was too much already.

"It's a damned shame they can't reproduce in captivity,
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but that's—".

"Oh but they can," the old woman broke in. "I can make them."

Caitland started to object, managed to stifle his natural reaction. He forced himself to think more slowly, more patiently than was his wont. This was a big thing. If this old bat wasn't looney from living alone out in the back of nowhere, and if she *had* found a way to make the chimers reproduce in captivity, then she could make a lot of people very very wealthy.

Or a few people even wealthier. Caitland knew of at least one deserving candidate.

"I hadn't heard," he said warily, "that anyone had found a way to make the trees even grow after replanting."

"That's because I haven't told anyone yet," she replied crisply. "I'm not ready yet. There are some other things that need to be perfected for the telling first."

"Because if I announced my results and then demonstrate them, I'll have to use this forest. And if the eaters find this place, they'll transplant it, rip it up, take it apart and sell it in pieces to the highest bidders. And then I won't be able to make anything reproduce, show anybody anything."

"And that *will* be the end of the chimer tree, because this is the last forest. When the oldest trees die a couple of thousand years from now there'll be nothing left but recordings...ghosts of shadows of the real thing. That's why I've got to finish my work here before I let the secret...and this location...out."

It made things much simpler for the relieved Caitland. She was crazy after all. Poor old bitch, he could understand it, the loneliness and constant alien singing of the trees and all. But she'd also saved his life. Caitland was not ungrateful. He would wait.

He wondered, in view of her long diatribe, if she'd try to stop him from leaving.

"Listen," he began experimentally, "when I'm well enough I'd like to...leave here. I have a life to get back to, myself. I'll keep your secret, of course...I understand and sympathize with you completely. How about a...?"

"I don't have a power flitter," she said.

"Well then, your fanship."

She shook her head, slowly.

"Ground buggy?" Another negative shake. Caitland's brows drew together. Maybe she didn't *bave* to worry about keeping him here. "Are you trying to tell me you have no form of transportation up here whatsoever?"

"Not exactly. I have Freia, my horse, and the wagon she pulls. That's all the transportation I need, that and what's left of my legs. Once a year an old friend airdrops me certain necessary supplies. He doesn't land and he's no botanist, so he's unaware of the nature of this forest. A miner...simple man, good man."

"My electronic parts and such, which I code-flash to his fan on his yearly pass over, constitute most of what he brings back to me. Otherwise," and she made an expansive gesture, "the forest supplies all my needs."

He tensed. "You have tridee or radio communication, for emergencies, with the...?"

"No, young man, I'm completely isolated here. I like it that way."

He was wondering just *how* far off course the storm had carried him. "The nearest settlement...Vaarnland?"

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She nodded. That was encouraging, at least. "How far by wagon?"

"The wagon would never make it. Terrain's too tough. Freia brought me in...and out one time, and back again, but she's too old now, I'd say."

"On foot, then." She looked thoughtful.

"A man your size, in good condition, if he were familiar with the country...I'd say three to four months, barring mountain predators, avalanche, bad water and other possibilities."

So he would have to be found. He wasn't going to find his way out of here without her help, and she didn't seem inclined to go anywhere. Nor did threats of physical violence ever mean much to people who weren't right in the head.

Anyhow, it was silly to think about such things now. First, his leg and ribs had to mend. Better to get her back on a subject she was more enamored of. Something related to her delusions.

"How can you be so sure these trees can be made to reproduce after transplanting?"

"Because I found out why they weren't and the answer's simple. Any puzzle's easy to put together, provided none of the pieces fall off the table. If you're well enough to walk in a few days, I'll show you. The crutches I've got are short for you, but you'll manage..."

THE FOREST VALLEY was narrow, the peaks cupping it between their flanks high and precipitous. Ages ago a glacier had cut this gorge. Now it was gone, leaving gray walls, green floor, and a roof of seemingly perpetual clouds...low-hanging clouds which shielded it from discovery by air.

The old woman, despite her disclaimers, seemed capable of getting around quite well. Caitland felt she could have matched his pace even if he weren't burdened with the crutches. Though she insisted any strenuous climbing was past her.

Despite the narrowness of the valley, the forest was substantial in extent. More important, the major trees were an astonishing fifty percent chimer. The highest density in the records was thirty-seven percent. That had been in the great Savanna forest on the south continent, just below the capital city of Danover. It had been stripped several hundred years ago.

Katie expounded on the forest at length, though resisting the obvious urge to talk nonstop to her first visitor in...another question Caitland had meant to ask.

Chimer trees of every age were here...mature trees at least fifteen hundred years old; old trees, monarchs of the forest that had sung their songs through twice that span; and youngsters, from those narrow boles only a few hundred years old down to sprouting shoots no bigger than a blade of grass.

Everything pointed to a forest that was healthy and alive, a going biological concern of a kind only dreamed about in botanical texts. And he was limping along in the middle of it, one of only two people in the universe aware of its existence.

It wasn't the constant alien music, or the scientific value that awed him. It was the estimated number of chimer trees multiplied by some abstract figures. The lowest estimate Caitland could produce ran into the hundreds of

millions.

He could struggle into Vaanland, register claim to this parcel of backland, and...and nothing. One of the things that made Caitland an exceptional man among his type was that he respected his own limitations. This was too big for him. He was not a developer, not a front man, not a Big Operator.

Very well, he would simply take his cut as discoverer and leave the lion's share for those who knew how to exploit it. His percentage would be gratefully paid. There was enough here for everyone.

He listened to the music, at once disturbing and infectious, and wished he could understand the scientific terms the old woman was throwing at him.

The sun had started down when they headed back towards the house, cabin, Caitland had discovered, with an adjoining warehouse. Nearly there, Katie stopped, panting slightly. More lines showed in her face now, lines and strain from more than age.

"Can't walk as far as I used to. That's why I need Freia, and she's getting on, too." She put a hand out, ran a palm up and down one booming young sapling. "Magnificent, isn't it?" She looked back at him.

"You're very privileged, John. Few people now alive have heard the sound of a chimer forest except on old recordings. Very privileged." She was watching him closely. "Sometimes I wonder..."

"Yeah," he muttered uncomfortably.

She left the tree, moved to him and felt his chest under the makeshift shirt she'd sewn him. "I mended this clothing as best I could, and I tried to do the same with you. I'm no doctor. How do your ribs feel?"

"I once saw a pet wolfhound work on an old steak bone for a couple of weeks before he'd entirely finished with it. That's what they feel like."

She removed her hand. "They're healing. They'll continue to do so, provided you don't go falling out of storms in the next couple of months." She started on again.

He followed, keeping pace with ease, taking up great spaces with long sweeps of the crutches. His bulk dwarfed her. Towering above he studied the wasted frame, saw the basic lines of the face and body. She'd been a great beauty once, he finally decided. Now she was like a pressed flower to a living one.

What, he wondered, had compelled her to bury herself in this wilderness? The forest kept her here, but what had brought her in the first place?

"Look," he began, "it looks like I'm going to be here for a while." She was watching him, and laughed at that. She was always watching him, not staring, but not looking away, either. Did she suspect something? How could she? That was nonsense. And if she did, he could dispose of her easily, quickly. The ribs and leg would scarcely interfere. He could...

"I'd like to earn my keep." The words shocked him even as he mouthed the request.

"With those ribs? Are you crazy, young man? I admit I might have thought of much the same thing, but..."

"I don't sponge off anyone, lady...Katie. Habit."

She appeared to consider, replied, "All right. I think I know an equally stubborn soul when I see one. Heaven knows there are a lot of things I'd like to have done that this body can't manage. I'll show them to you and when

you feel up to it, you can start in on them."

He did, too, without really knowing why. He told himself it was to keep his mind occupied and lull any suspicions she might develop...and believed not a word of his thoughts.

The song of the forest, he noticed, varied constantly. The weather would affect it, the cry of animals, the time of day. It never stopped, even at night.

He hauled equipment, rode with her in the rickety wagon to check unrecognizable components scattered the length and breadth of the valley, cut wood, repaired a rotting section of wall in the warehouse, repaired the cabin roof, tended to Freia and her colt., and tried to ignore those piercing eyes, those young-old blue eyes that never left him.

And because he wouldn't talk about himself much, they spent spare moments and evenings talking about her, and her isolation, and the how and why of it.

She'd found the forest nearly thirty years ago and had been here constantly, excepting one trip, ever since. In that time she'd confirmed much that was suspected, all that was known, and made many new discoveries about the singing trees.

They began to make music when barely half meter high shoots, and retained that ability till the last vein of sap dried in the aged trunk. They could grow to a height of eighty meters and a base diameter of ten.

Chimers had been uprooted and transplanted since their music-making abilities had been first discovered. At one time it seemed there was hardly a city, a town, a village or wealthy individual that didn't own one or two of the great trees.

Seemingly, they thrived in their new environments, thrived and sang. But they would not reproduce...from seeds, from cuttings, nothing. Not even in the most controlled greenhouse ecology, in which other plants from Chee survived and multiplied. Only the chimer died out.

But none of those wealthy music lovers had ever heard a whole forest sing, Caitland reflected. He'd never heard a sound like it before himself, and never would again.

Once more she explained to him how the trees sang, how the semi-flexible hollow trunk and the rippling protrusions inside controlled the flow of air through the reverberating bole to produce an infinite range of sound. How the trunk sound was complemented by the tinkling bells...chimes...on the branches. Chimes which were hard, shiny nuts filled with loose seeds.

With the vibration of the main trunk, the branches would quiver, and the nuts shake, producing a light, faintly bell-like clanging.

"And that's why," she finally explained to him, "the chimers won't reproduce in captivity. I've calculated that reproduction requires the presence of a minimum of two hundred and six healthy, active trees.

"Can you think of any one city, any one corporation, any one system that could afford two hundred and six chimers of a proper spread of maturity?"

Of course he couldn't. No system, not even Terra-Sol, could manage that kind of money for artistic purposes.

"You see," she continued, "it takes that number of trees, singing in unison, to stimulate the bola beetle to lay its eggs. Any less and it's like an orchestra playing a symphony by Mahler. You can take out, say, the man with the

cow-bell and it will still sound like a symphony...but it won't be the right symphony. The bola beetle is a fastidious listener."

She dug around in the earth, came up with a pair of black, stocky bugs about the size of a thumbnail. They scrambled for freedom.

"When the nuts are exactly ripe, the forest changes to a certain highly intricate melody with dozens of variations. The beetles recognize it immediately. They climb the trees and lay their eggs, several hundred per female, within the hollow space of the nuts. The loose seeds inside, at the peak of ripeness, provide food for the larvae while the hard shell protects them from predators. And it all works out fine from the bola's point of view...except for the tumbuck.

"That small six-legger that looks like an oversized guinea pig?"

"That's the one. The tumbuck, John, knows what that certain song means, too. It can't climb...but it's about the only critter with strong enough teeth to crack a chimer nut. When the ripe nuts drop to the ground, it cracks them open and uses its long, thin tongue to hunt around inside the nut...not to scoop out the seeds, which it ignores, but the insect eggs.

"It's the saliva of the tumbuck, deposited as it seeks out the bola eggs, which initiates the germinating process. The tumbuck leaves the nut alone and goes off in search of other egg-filled ones. Meanwhile the seed is still protected by most of its shell.

"Stimulated by the chemicals and dampness of the tumbuck saliva, the first roots are sent out through the crack in the shell and into the ground. The young plant lives briefly inside the shell and finally grows out through the same crack towards the light.

"It's the song of the massed trees that's the key. That's what took me twenty years to figure out. No wonder bola beetles and tumbucks ignored the nuts of the transplanted chimers...the music wasn't right. You need at least two hundred and six trees...the full orchestra."

Caitland sat on the wooden bench cut from a section of log and thought about this. Some of it he didn't understand. What he could understand added up to something strange and remarkable and utterly magnificent, and it made him feel terrible.

"But that's not all, John Caitland. My biggest discovery started as a joke on myself, became a hobby, then an obsession." There was a twinkle in her eyes that matched the repressed excitement in her voice. "Come to the back of the warehouse."

A metal cabinet was set out there, one Caitland had never seen her open before. Leads from it were connected, he knew, to a number of complex antennae mounted on the warehouse roof. They had nothing to do with long-range communications, he knew, so he'd ignored them.

The instrumentation within the cabinet was equally unfamiliar. Katie ran her hand up and down the bole of a young chimer that grew almost into the cabinet, then moved her hands over the dials and switches within. She leaned back against the tree and closed her eyes, and one hand resting on a last switch, the other stroking the trunk, like a cat, almost.

"Now look, John, and tell me what you feel." She threw the switch.

For long seconds there was nothing different, only the

YE WHO WOULD SING

humming of the batwinged mammals that held the place of birds here. And that familiar song of the forest.

But even as he strained all his senses for he knew not what, the song...changed. It changed unabashedly and abruptly, astoundingly, fantastically.

Gloriously.

Something grand thundered out of the forest around him, something too achingly lovely to be heard. It was vaguely familiar, but utterly transformed by the instrument of the forest, like a tarnished angel suddenly made clean and holy again.

To Caitland, whose tastes had never advanced beyond the basal popular music of the time, this sudden outpouring of human rhythm couched in alien terms was at once a revelation and a mystery. Blue eyes opened and she stared at him as the music settled into a softer mode, rippling, pulsing about and through them.

"Do you like it?"

"What?" he mumbled lamely, overpowered, awed.

"Do you like it?"

"Yeah, I like it." He leaned back against the wall of the cabin and listened, let the new thing shudder and work its way into him, felt the vibrations in the wood wall itself. "I like it a lot. It's..." and he finished with a feeling of horrible inadequacy, "...nice."

"Nice?" she murmured, the one hand still caressing the tree. "It's glorious, it's godlike...It's Bach. 'The Toccata and Fugue in D Minor,' of course."

They listened to the rest of it in silence. After the last thundering chord had died away and the last echo had rumbled off the mountainsides, and the forest had resumed its normal chanting, he looked at her and asked, "How?"

"Twelve years," she said, "of experimentation, of developing proper stimuli procedures and designing the hardware and then installing it. The entire forest is wired. You've helped me fix some of the older linkages yourself. Stimulus-response, stimulus-response. Try and try and try again, and give up in disgust, and go back for another try.

"My first successful effort was 'Row, row, row your boat'. It took me nine years to get one tree to do that. But from then on response has been phenomenal. I've reduced programming time to three months for an hour's worth of the most complex Terran music. Once a pattern is learned, the forest always responds to the proper stimulus signal. The instrumental equivalents are not the same, of course..."

"They're better," Caitland interrupted. She smiled.

"Perhaps. I like to think so. Would you like to hear something special? The repertoire of the forest is still limited, but there's the chance that—"

"I don't know," he answered. "I don't know much about music. But I'd like to learn, I think."

"All right then, John Caitland. You sit yourself down and relax."

She adjusted some switches in the console cabinet, then leaned back against her tree. "It was observing the way the slight movements caused by the vibrations seemed to complement each other that first gave me the clue to their reproductive system, John. We have a few hours left before supper." She touched the last switch.

"Now this was by another old Terran composer." Olympian strains rolled from the trees around them as the forest started the song of another world's singer.

Alan Dean Foster

"His name was Beethoven," she began.

CAITLAND listened to the forest and to her for many days. Exactly how many he never knew because he didn't keep track. He forgot a lot of things while he was listening to the music and didn't miss them.

He would have been happy to forget them forever, only they refused to be forgotten. They were waiting for him in the form of three men one day. He recognized them all, shut the cabin door slowly behind him.

"Hello, John," said Morris softly. Wise, easy-going, ice-hard Morris.

Three of them, his employer and two associates. Associates of his, too.

"We'd given you up for lost," Morris continued. "I was more than just pleased when the old lady here told us you were all right. That was a fine job you did, John, a fine job. We know because the gentleman in question never made his intended appointment."

"John." He looked over at Katherine. She was sitting quietly in her reading chair, watching them. "These gentlemen came down in a skimmer, after lunch. They said they were friends of yours. How did you do on the broadcast unit?"

"Fixed some wiring, put in a new power booster," he said automatically. "They're business associates, Katie."

"Rich business associates," added Ari, the tall man standing by the stove. He was examining the remains of a skinned asbolite-dinner. He was almost as big as Caitland. Their similarities went further than size.

"It's not like you to keep something like this to yourself, John," Morris continued, in a reserved tone that said Caitland had one chance to explain things and it had better be good.

Caitland moved into the main room, put his backpack and other equipment carefully onto the floor. If his body was moving casually his mind was not. He'd already noticed that neither Ari nor Hashin had any weapons out; but that they were readily available went without saying. Caitland knew Morris' operating methodology too well for that... He'd been a cog in it himself for three years now. A respected, well-paid cog.

He spoke easily, and why not, it was the truth.

"There's no fan or flitter here, not even a motorbike, Mr. Morris. You can find that out for yourself, if you want to check. Also no telecast equipment, no way of communicating with the outside world at all."

"I've seen enough electronic equipment to cannibalize a simple broadcast set," the leader of the little group countered.

"I guess maybe there is, if you're a com engineer," Caitland threw back. Morris appeared to find that satisfactory, even smiled slightly.

"True enough. Brains aren't your department, after all, John." Caitland said nothing.

"Even so, John, considering a find like this," he shook his head, "I'm surprised you didn't try to hike out."

"Hike out how, Mr. Morris? The storm blew me to hell and gone. I had no idea where I was, a busted leg, a bunch of broken ribs, plus assorted bruises, contusions and strains. I wasn't in any shape to walk anywhere, even if I'd known where I was in relation to Vaanland. How did you find me,

GALILEO 75

anyway? Not by the automatic com caster, or you'd have been here weeks ago."

"No, not by that, John." Morris helped himself to the remaining chair. "You're a good man. The best. Too good to let rot up here. We knew where you were to go to cancel the appointment. I had a spiral charted from there and a lot of people out hunting for you."

"They spotted the wreckage of your fan three days ago. I got here as fast as I could. Dropped the business, everything." He rose, walked to a window and looked outside, both hands resting on the sill.

"Now I see it was all worth waiting for. Any idea how many trees there must be in this valley, Caitland?"

He ought to be overjoyed at this surprise arrival. He tried to look overjoyed.

"Thousands," Morris finished for him, turning from the window. "Thousands. We'll file a formal claim first thing back in Vaanland. You're going to be rich, John. Rich beyond dream. I hope you don't retire on it...I need you. But maybe we'll all retire, because we're all going to be rich."

"I've waited for something like this, hoped for it all my life, but never expected anything of this magnitude. Only one thing bothers me." He turned sharply to stare at the watching Katherine.

"Has she filed a claim on it?"

"No," Caitland told him. "It should still be open land." Morris relaxed visibly.

"No problem, then. Who is she, anyway?"

"A research botanist," Caitland informed him, and then the words tumbled out in a rapid stream. "She's found a way to make the trees reproduce after transplanting, but you need a full forest group, at least two hundred and six trees for it. If you leave at least that many, out of the thousands, we'll be able to mine it like a garden, so there'll always be some trees available."

"That's a good idea, John, except that two hundred and six trees works out to about twenty million credits. What are you worrying about saving them for? They live two, sometimes three thousand years. I don't plan to be around then. I'd rather have my cash now, wouldn't you?"

"Ari?" Caitland's counterpart looked alert. "Go to the skinner and call Nohana back at the lodge. Give him the details, but just enough so that he'll know what piece of land to register. Tell him to hop down to Vaanland and buy it up on the sly. No one should ask questions about a piece of territory this remote, anyway."

The other nodded, started for the door—found a small, gray-haired woman blocking his way.

"I'm sorry, young man," she said tightly, looking up at him, "I can't let you do that." She glanced frantically at Caitland, then at Morris and Hashin. "You can't do this, gentlemen. I won't permit it. Future generations—"

"Future generations will survive no matter what happens today," Morris said easily.

"That's not the point. It's what they'll survive in that—"

"Lady, I work hard for my money. I do a lot of things I'd rather not do for it, if I had my druthers. Now, it seems, I do. Don't lecture me. I'm not in the mood."

"You mustn't do this."

"Get out of my way, old woman," rumbled Ari warningly.

"Katie, get out of his way," Caitland said quietly. "It'll be all right, you'll see."

She glared at him, azure eyes wild, tears starting. "These

are subhumans, John. You can't talk to them, you can't reason with them. Don't you understand? They don't think like normal human beings, they haven't the same emotions. Their needs spring from vile depths that—!"

"Warned you," Ari husked. A massive hand hit her on the side of the head. The thin body slammed into the door sill, head meeting wood loudly, and crumpled soundlessly to the floor. Ari stepped over one bent withered leg and reached for the handle.

Caitland broke his neck.

There was no screaming, no yells, no sounds except for the barely articulate inhuman growl that might have come from Caitland's throat. Hashin's gun turned a section of the wall where Caitland had just stood into smoking charcoal. As he spun, he threw the huge corpse of the dead Ari at the gunman.

It hit with terrible force, broke his jaw and nose. Splinters from the shattered nose bone pierced the brain. Morris had a high-powered projectile weapon. He put four of the tiny missiles into Caitland's body before the giant beat him into a permanent silence.

It was still in the room for several minutes. After this one form stirred, it rose slowly to its feet. A bruise mark the size of a small plate forming on her temple, Katherine staggered over to where Caitland lay draped across the bulging-eyed, barely human form of Morris.

She rolled the big man off the distorted corpse. None of the projectiles had struck anything vital. She stopped the bleeding, removed the two metal cylinders still in the body, wrestled the enormous limp form into bed.

It was time to wait for him again.

CAITLAND stayed with her in the mountains for another sixteen years. It was only during the last two that she grew old with a speed that appalled and stunned him. When the final disease took hold, it was nothing exotic or alien, just oldness. The overworked body was worn out.

She'd been like that on the bed for days now, the silvery hair spread out like a steel powder behind her head, the wrinkles uncamouflaged by smiles anymore, the energy in the glacier-blue eyes fading slowly.

"I think I'm going to die, John."

He didn't reply. What could one say?

"I'm scared." He took the flimsy hand in his own. "I want it to be outside. I want to hear the forest again, John."

He scooped up the frighteningly thin form, blankets and all, and took her outside. There was a lounge chair he'd built for her a year ago, next to the young tree by the control cabinet.

"... hear the forest again, John. . . ."

He nodded and went to the console (which he'd long since become as expert in operating as herself), thought a moment, then set the instrumentation. They'd added a lot of programming these past years, from her endless crates of tapes.

The alien chant faded, to be replaced by a familiar melody, one of his and her favorites.

"I can't reach the tree, John," came the whispery, paper-thin voice. He moved the lounge a little nearer to the tree, took her arm and pressed her hand against the expanding, contracting trunk. She had to touch the tree, of course. Not only because she loved the forest and its music, but for the

YE WHO WOULD SING

reason he'd discovered fifteen years ago.

The reason why she always followed him with her eyes, . . . so she could see his face, his throat, . . . his lips.

She'd been completely deaf since the age of twelve. No wonder she'd been so sensitive to the vibrations of the trees. No wonder she'd been so willing to isolate herself, to leave the rest of a forever incomprehensible mankind behind.

No wonder.

There was a cough an hour or so later. Gradually a coldness crept into the other hand, the one he held. He folded it over the shallow chest, brought the other one across, too. Crying he'd have none of. He was too familiar with death to cry in its presence.

Instead he watched as the music played out its end and the sun went down and the stars appeared, . . . foam-like winking friends of evening looking down at them.

Some day soon he would go down and tell the rest of mankind what lived and thrived and sang up here in a deep notch of the Silver Spars. Some day when he thought they were hungry and deserving enough. But for a little while longer he would stay. He and the shell of this remarkable woman, and Freia's daughter, and listen to the music.

He sat down, his back against the comforting massage of the pulsing bark, and stared up into the outflung branches where loose seeds rang like bells inside hard-shelled nuts and the towering trunk exhaled magnificence into the sky.

This part coming up now, this part he knew well. The tree expanded suddenly, shuddered and moaned and the thunder of the rising crescendo echoed down the valley as thrice a thousand chimers piled variation and chorus and life into it.

Beethoven, it was. . .



Felice cont.—from page 67

the spume of steam soaring to the sky.

The satisfying sound of a monstrous track-laying machine was growing louder. Soon it drowned the birds' calls and the click of his boots. Had he waited just a few more days, he could have ridden the rail to the junction, caught a coastbound monorail. But Erik could not wait. His feet carried him steadily, today, now, without delay. His shoulders were already itching from the backpack; he was barely aware that he slipped his fingers under the straps to ease them. His mind was speculating on what new sight might be around the next curve, wondering if the desert were cool this time of year, and what lay beyond the western sea.



Lichtenberg cont.—from p. 23

But the lucidity was fading, and Fenton knew that from now on, he'd get no sleep at all.

IF THE WEEK had been arduous, the following hours were hell. Fenton had to content himself with fighting a delaying action, giving in gracefully when it was no longer possible to forestall the inevitable. Several times Zepon's labored breathing ceased and, swallowing his heart, Fenton pumped air into the mucus filled lungs and bore Zepon's increasing hatred with calm indifference. He knew that if he lived, Zepon would be cheerfully thankful.

During the rare moments of inaction, Fenton kept himself awake by rehearsing the defense of his actions. He was sure he could sell the Stovain VI project, if only he could keep Zepon alive. The Board was composed of men whose sole motivation was making money. They'd condone anything if there was a clear profit in it. With an experienced leader, a colony just might succeed.

Eventually, Fenton stopped watching the clock and just conquered each minute separately. He convinced himself that the nightmare would go on forever and counted each choked breath a victory and each muttered curse a triumph. He talked himself hoarse alternating quiet encouragement with acid tipped jibes at Zepon's pride couched in the remains of his spoken Stilhzani.

The doorchime, when it came, was an unexpected shock to fatigued-decadent nerves. He palmed the lock button and forced himself to his feet as the four Stilhzani rescue workers entered with their bubble stretcher.

They brushed the human aside and went quietly to work, handling the patient with sympathetic expertise. In moments, they'd transferred the groaning and gasping Zepon to the stretcher and as the others departed, one of them came over to Fenton, "Not have we met before?" asked the Stilhzani, searching Fenton's stubbled chin with double-pupiled eyes.

Fenton smoothed back his hair, oddly conscious of its increasing thinness, "Yes, we have. Many years ago, I had a friend—"

"Yess," the Stilhzani's neck frill flushed purple in assent, "I remember Khela'an. You now have a new friend?"

"Possibly. But at the moment he hates me."

"You will speak with him later."

"Of course. I understand."

"I must go."

"Sleep warmly," Fenton called after the swiftly retreating back making a mental note to brush up on his spoken Stilhzani. It seemed he was going to need it.



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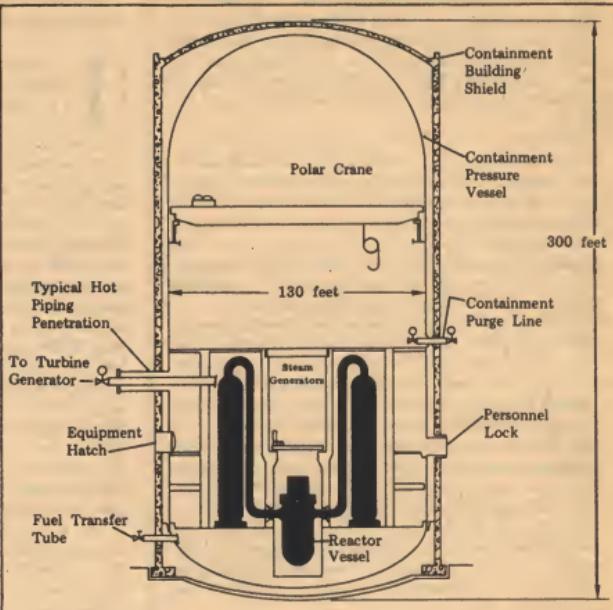
Nuclear Debate: A Call To Reason

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PUBLIC DISCUSSIONS of energy technology safety have tended to focus on nuclear power and in particular, on the "maximum credible accident," the accident with the worst postulated consequences. In focusing on this one improbable event, sight is lost of the range of nuclear accidents that have lesser consequences but are more probable. More important, it is really necessary to consider the risks from all sources in *every* form of power generation, and to compare them carefully, in order to gain a reasoned perspective.

All energy sources involve risks of some degree at virtually every step in the fuel "cycle." There are risks of large accidents with oil, gas, nuclear and hydroelectric power plants and public health risks of significant magnitude from pollutants released during the normal operation of coal, oil, and geothermal power plants. These risks are not only to the general public but to the workers providing the energy.

The concept of a maximum credible accident can be applied to non-nuclear methods of power production, although this is not common practice.



For example, when the worst conceivable accident for a liquid natural gas facility is examined in detail, it is evident that the likelihood is much higher than, and the consequences similar to, those for a major nuclear accident. An important point to remember in discussing accidents is that the risks and consequences of *normal* operation are often all too real. It is also important to remember that there never has been a worst case nuclear or non-nuclear power plant accident.

NUCLEAR POWER

Nuclear power plants have demonstrated an exceptional record of safety. No member of the general public has been injured, much less killed, by the operation of these plants. This is in large part a result of the body of regulations and standards that the Nuclear Regulatory Commission (formerly the Atomic Energy Commission) has promulgated and enforced. In spite of this record it is recognized that there is a possibility, however small, that a nuclear plant accident could release serious amounts of radioactivity.

It must be said first of all that there is no conceivable way that a nuclear reactor could explode like a bomb. This is literally physically impossible because the fuel is far too dilute.

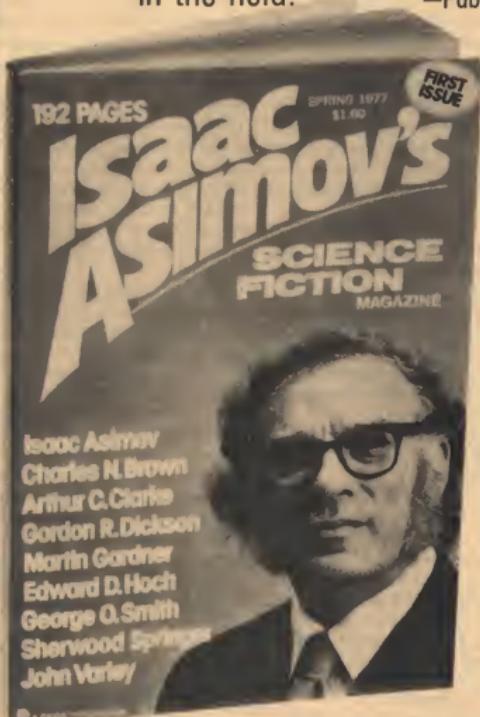
A nuclear accident that might result in the release of significant amounts of radioactive material can be postulated to occur as a result of a "guillotine" break of a main reactor cooling water pipe that provides the cooling for the nuclear fuel "core" (see Figure 1, items 8 and 10, and Figure 2.) For a major accident to occur, a main reactor cooling water pipe* must not just crack or split open, the way that a pipe would generally be expected to fail. It must actually break cleanly all the way around (a so-called "guillotine break"), and the two ends completely separate so that the cooling water can pour out of both open ends of the pipe unimpeded. Because nuclear piping is designed to high seismic (earthquake-resistant) and stringent quality standards it is highly unlikely that a

*These steel pipes are extremely large, about 36 inches in diameter, with a $3\frac{1}{8}$ -inch wall thickness.

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guillotine break would occur.

If such a break should happen, the result would be what is known as a Loss of Coolant Accident (LOCA). The reactor vessel would lose pressure as water poured out of the break. The nuclear fission reaction would shut off as soon as water was lost, but the radioactive "fission products" in the fuel would continue to generate considerable heat. The cooling water in the vessel would turn to steam, leaving the nuclear fuel without an adequate cooling medium. This situation could lead to melting of the radioactive fuel unless some alternative means of cooling is provided.

The much discussed Emergency Core Cooling Systems (ECCS) are intended to provide several backup supplies of cooling water to keep the fuel from melting. The ECCS has been the subject of a great deal of controversy¹ and a lengthy hearing by the Atomic Energy Commission.¹ The controversy centered on the fact that there was not adequate knowledge of the performance of reactor systems under LOCA conditions to support the computer predictions of ECCS performance, and that there had been virtually no actual tests of this system under realistically simulated accident conditions.

As a result of hearings, the Atomic Energy Commission's design regulations for the ECCS were made more stringent and the computer codes used for design became much more sophisticated. In addition, nuclear reactors are now using fuel "rods" that are smaller than those previously used. These smaller rods are more easily cooled. It is our opinion that an ECCS can reasonably be expected to operate effectively and prevent the nuclear fuel from melting.

With respect to the question of actual testing, the long-awaited Loss of Fluid Test (LOFT) reactor in Idaho Falls has recently started operation, and has run the first four in a series of ECCS performance experiments.³ These tests⁴ have confirmed the conservatism of those elements of the ECCS computer models that they were designed to examine. Additional tests with a real nuclear core will be made in 1977.

But it is possible that the ECCS will

¹One of the authors of this paper was an author of the first Union of Concerned Scientists paper critical of the ECCS.²

not work so let us follow the subsequent course of the postulated accident. If the radioactive fuel is left uncooled it will melt (due to residual heating) and slump to the bottom of the steel pressure vessel, melt through the vessel and into the concrete foundations below.

At this point it is possible that the molten nuclear fuel could melt its way through the foundation of the plant and, if it somehow remained together as a single lump, melt into the earth below the plant (sometimes called the "China Syndrome"). This would not have severe consequences because gaseous and volatile fission products would be contained inside the airtight containment building (where additional safety systems would remove them), or in the earth below the plant which would have the capacity to absorb and trap all but a few gaseous materials.

For serious consequences to result, still another unlikely event must occur—the failure of the containment building (see Figure 1, item 4). This airtight building surrounding the reactor is usually made of reinforced concrete 3 to 6 feet thick and lined with leak-tight steel plate. It is designed to withstand the high pressures that could result from the release of steam and gases in an accident, and to withstand the blows of heavy flying objects (such as telephone poles in a tornado).

But it is possible that the containment might fail as a result of an over-pressure of steam and gases greater than expected, or some other means. Many of the fission products released in the accident would plate out on surfaces inside the building, but if the containment were somehow seriously breached then large amounts of radioactivity would be released to the atmosphere.

Yet, still another set of conditions must exist for this accident to produce serious injury or death. The weather conditions must be just wrong. A temperature inversion should exist to prevent the radioactive gases from rising much. The wind must be moderate and steady; too fast and the gases disperse; too slow and they rise upwards. And of course this steady wind must be blowing toward a large population center fairly close by, and fast enough (consistent with holding the radioactive cloud together—about seven miles per hour) that the population has the

minimum time to evacuate.

If all these unlikely events—guillotine break, ECCS failure, containment rupture and worst weather conditions—occur one after the other, then the "worst case" accident might lead to the death of 1000 to 3000 people. While these numbers may seem frightening to some (however remote the risk), we will see that these risks are less than the risks from other current methods of generating electricity.

Rather than concentrate only on the worst case, we must understand the whole range of possible accidents, their likelihood and consequences. By far the most thorough study of reactor safety undertaken to date has been the recent Reactor Safety Study (WASH-1400)⁵ headed by Professor Norman C. Rasmussen of M.I.T. Because no nuclear plant accident with adverse effects on public health has ever occurred, this study had to make theoretical estimates of accident risks. The study team examined every pipe, valve and switch of current reactor designs using actual failure data where it existed and conservative estimates where it did not. Human error was taken into account, and the actual weather conditions and population distributions around existing nuclear plants were used. A conservative model of the effects of radioactivity⁶ was used to determine health impacts. These data were then combined in mathematical computer models to determine the likelihood and consequences of the entire range of conceivable nuclear accidents.

The results of the Reactor Safety Study, summarized in Figure 3, bear close examination.

1. The likelihood of a "core meltdown" was found to be very small—once in 20,000 reactor years (once every 200 years for 100 reactors).
2. Not every meltdown would result in injury to the public. Few would have consequences that would even be measurable. Only one meltdown in 100 would result in the death of more than 10 people.
3. The worse the accident, the lower its probability is. An accident that would result in the death of 100 people or more would be expected to occur every ten million reactor-years (every 100,000 years for 100 reactors);

one that caused the death of 1000 people or more would be expected to occur every 100 million reactor-years (every million years for 100 reactors). Clearly, these are highly improbable events.

4. These risks are far less than those from other man-caused accidents or natural events. Of particular note should be fires and explosions (some of which relate to the use of oil and gas), and dam failures (related to hydroelectric power).

The health impacts associated with the *normal* operation of a nuclear power plant are minimal. The very small amounts of radioactivity that are released from nuclear plants in normal operation amount to one-thousandth or less of the radiation from natural sources (earth, sun, etc.) and man-made sources (x-rays, etc.). The occupational risks for workers are less than those in other fuel cycles (see Table 1).

In summary, nuclear power is not perfectly safe and no absolute assurance can be given against the risk of an accident. But the overall risks are small, and less than those of the other ways in which we currently generate electricity.

HYDROELECTRIC

The hydroelectric dam has been a long-term provider of electric energy but is less safe than is generally realized. The major risk with hydro is the potential for a catastrophic failure of a dam that would release the large volume stored behind it into populated areas below the dam. Eight dam failures have killed a total of 2900 people in the U.S. in the last 100 years, and a major land-slide at a dam in Vajont, Italy in 1963 killed 1800 people.⁷ In the U.S. today there are about 20 major dams with large populations exposed below them, and it has been estimated that fatalities of 1000 to 100,000 could result from failure.⁸ The likelihood of a dam failure in the U.S. that would kill 10,000 people has been calculated to be once every 1000 years.⁹ While a hydroelectric dam does not routinely cause public health problems, the risk and consequences of a dam failure are very much greater than for a nuclear plant accident (see Figure 3).

Nuclear Debate

COAL

A coal power plant does not have the potential for a catastrophic accident that hydroelectric or nuclear power plants do, although landslides resulting from coal mining operations do pose risks. Coal's danger to public health and safety lies primarily with its effects on the respiratory system. The routine emissions from burning coal in power plants result in a continual degradation of the atmosphere. The waste products, sulfur dioxide, nitrous oxides, unburnt hydrocarbons, carbon monoxide, particulates, and heavy metals, released to the atmosphere by the combustion of coal, have been shown to be detrimental to health. The exact extent of these health effects is not well understood since relatively little effort has been expended on research in this area to date. Estimates^{10,11,12,13} for a single large (1000 megawatt) coal plant have ranged from 2 to 200 deaths per year, mostly among the young and elderly. The impact varies with coal quality, pollution control, population density and other factors. The sickness and early mortality resulting from the continuous release of these gaseous efflu-

ents is far greater than the average injury and death resulting from nuclear, oil or gas accidents.

Unfortunately, this is not the only problem with the use of coal. In 1970 alone, 260 miners died in accidents and 11,552 were injured.¹⁴ Many miners were also claimed by pneumoconiosis or "black lung". Black lung benefits paid out by the Federal Government to disabled miners or their dependents amounted to 952 million dollars in 1974.¹⁴

OIL

At any point from refining to controlled burning in a boiler, accidental ignition of large quantities of oil could occur. Many different serious accidents could happen during the course of handling large amounts of oil.¹⁵ Several large fires have occurred at oil storage locations or refineries that have had the potential for causing severe injury and death. Concern is not just with the possibility of death by fire, but

¹⁰ For example, during the last 15 years there has been an average of 14 oil tanker explosions per year. There are now over 60 tankers of more than 200,000 tons capacity in service, over 300 under construction and over 100 in planning stages.¹⁶

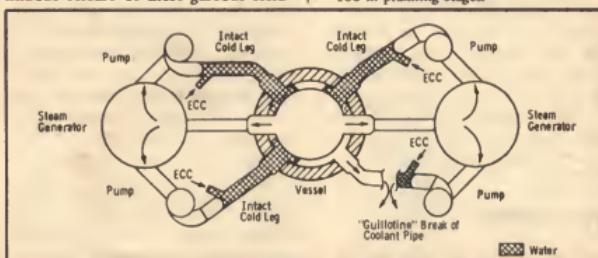


FIGURE 3 PLAN VIEW OF REACTOR AND PRIMARY COOLANT LOOPS
TABLE 2 COMPARATIVE ENVIRONMENTAL IMPACTS OF 1000 MEAWATT ELECTRIC POWER PLANTS WITH GENERALLY PREVAILING ENVIRONMENTAL CONTROLS

System	Air Emissions		Water Discharges		Solid Waste		Land Use		Property Damage from Plant Operation (billions of dollars)	Potential for Large Scale Disaster
	Tox x 10 ³	Gen x 10 ³	Tox x 10 ³	Gen x 10 ³	Tox x 10 ³	Gen x 10 ³	Tox x 10 ³	Gen x 10 ³		
Deep-mined Coal	383	—	10	5	7.3	—	10	5	602	3 122 3 35 125
Surface-mined	383	—	10	5	40.5	—	10	5	3267	5 171 5 35 125
Desal.	158	—	10	3	3	—	10	3	11	2 25 80
Offshore Oil	158	—	10	3	61	—	10	4	NA	1 06 1 25 80
Imported	71	—	10	2	25	—	10	4	NA	1 02 1 25 80
Natural Gas	24	—	10	1	0.6	—	10	2	—	0 38 2 05 08
Nuclear	489	—	1	21.3	27	15	3	262	1.4 4 19 2 002	Core meltdown
Hydroelectric	—	—	0	—	—	—	0	100	4	NA Dam failure
Geothermal	141	—	38	4	149	—	51	2	—	0 87 3 NA Minimal, not well known

Severity rating key: 1=Significant, 2=Moderate, 3=Small, 4=Negligible. D=Small, NA=not available. M=megawatts thermal; a 75% capacity factor is assumed.

with the hazards of the thick smoke plume produced by an oil fire. Such a plume could produce consequences similar to those of the Great London Smog of 1952 which resulted in 3000 premature deaths.¹⁵ Again, wind conditions would have to be "just wrong". Oil fires in Bayonne, New Jersey, in 1973 and in Brooklyn, New York in 1976, took several days to extinguish. The wind fortunately blew the heavy, black, pollution-laden smoke out to sea where it was quickly dispersed by normal winds. However, had the weather conditions been different—an inversion preventing the smoke from rising, and the wind blowing towards New York City—a disaster could have resulted. A similar fire occurred outside Philadelphia in 1975.

Oil contains impurities similar to those that cause air pollution from coal, but in lesser quantities. The air pollutants routinely released from oil power plants cause somewhat lower health effects than coal (see Table 1).

LIQUIFIED NATURAL GAS

Liquefaction is one of the methods of rapidly and economically transporting large quantities of natural gas. It is extremely volatile and explosive. Several major LNG fires and explosions have occurred,⁷ one in Staten Island, New York in 1973 killed 40 people. Studies¹⁷ have indicated that the potential consequences of an LNG accident are comparable to those of a nuclear accident, and the likelihood much greater.

GEOTHERMAL

The health impacts of geothermal power are not particularly well known even though the quantities of effluents are known for some geothermal plants.^{18,19} The effluents emitted from a geothermal plant are ammonia, methane, hydrogen, hydrogen sulfide, heavy metals and radioactive elements. While not well understood, it is expected that these effluents could well have health effects comparable to those from coal or oil power plants.

ENVIRONMENTAL IMPACTS

THE PRODUCTION of electric energy from all fuel sources is environmentally degrading. This degradation can occur during each of the fuel processing steps

necessary prior to and following electricity production, as well as during production itself.

Major fuel utilization processes that have an impact on the environment are:

- Production (mining and extraction of the raw fuel source);
- Refining (preparing the raw fuel for combustion);
- Transportation (getting the fuel to the site of combustion);
- Burning the fuel to produce power;
- Disposal of the wastes after burning.

In addition, consideration must be given to the ultimate disposition of facilities (plants, dams, mines, etc.) at the end of their useful life. Decommissioning and reclamation are not given sufficiently thorough treatment at present.

The impacts of major concern caused by these processes are:

- Air Pollution;
- Water Pollution (thermal, chemical and radioactive);
- Solid Wastes;
- Land Use;
- Visual (aesthetic) Pollution;
- Occupational and Public Health.

The overall environmental effects of power generation, from the sources deemed feasible over the short term, are highlighted in Table 2. This table compares the environmental impact of electric generating systems in six basic areas. This table (adapted from one prepared by the Council on Environmental Quality and from other sources^{20,13,18}) also makes a subjective assessment of the severity of the impacts in these areas. It can be seen that coal has major impacts in all areas and the greatest overall impact on the environment. Oil and nuclear are rated about equal in overall impact on the environment.

ECONOMIC ANALYSIS OF ALTERNATIVES

ONE OF the most important factors in assessing a particular energy source is its economic cost. Currently, nuclear power is proving to be significantly cheaper than electricity from oil- and coal-burning power plants. In 1975, the average costs of generating electricity in the United States were:

Oil	—3.34 cents/kilowatt-hour,
Coal	—1.75 cents/kilowatt-hour,
Nuclear	—1.23 cents/kilowatt-hour.*

But will these lower costs continue in

the future?

Dramatic escalation in construction costs and fuel prices over the last several years will result in substantial increases in electricity costs from *all cheap energy*. However, many studies^{21,22,23} have been commissioned to assess the cost of electric generation systems and have concluded that, while all costs are going up, for the foreseeable future nuclear power will continue to be much less expensive than coal.

*In 1975, nuclear power provided 8.7% of U.S. electricity supply or 166 billion kilowatt-hours; by 1985 this will increase to about 23%, based on the plants currently ordered or under construction.

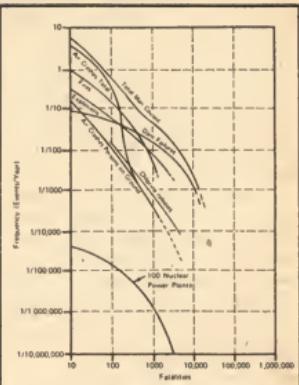


FIGURE 4 FREQUENCY OF FATALITIES DUE TO MAN CAUSED EVENTS

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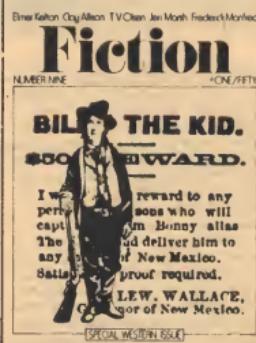
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A.A. Whyte

The Aleph:

A Seasonal Microcosm

Given below is an annotated listing of all known original Science Fiction and fantasy novels, collections and anthologies scheduled for American publication in January, February and March '77.



Greetings of the Season! Much to my delight, reaction to this column has been exceedingly favorable. It seems to answer a genuine need, to provide a service available nowhere else. Thankyou for your comments. We want The Aleph to be the most convenient and comprehensive single source of information in the field. With that aim in mind, please let us know what is most useful and interesting to you.

Lest there be any confusion, let me emphasize that the descriptions of books listed in The Aleph are not reviews. That is not the function of this column. It would be poor policy to attempt a critical evaluation of any title in advance of publication. Nor are we, on the other hand, promoting the books listed. Paid advertisements are to found in GALILEO, but not under my byline. Copy provided by the publisher is often my only source of information about a particular book. It is included for this reason.

Oh, and by the way... The title of the column comes from a story of the same name by Jorge Luis Borges. With luck, I'll be able to tell you why it was selected the next time around...

The following reference codes have been added for convenience and are noted on the same line as the author's name: (C) Collection, (P) Fantasy, (J) Juvenile. Since SF novels make up the majority of books listed, none of these are specified as such. Any given title may be assumed to be both SF and a novel, unless otherwise indicated. In order to differentiate between the compiler's words and those supplied by others, material from other sources is given [in brackets].

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ADAMS, Robert
SWORDS OF THE HORSECLANS
(Horseclans Series No.2)
Finnale/January/\$1.25

Sequel to THE COMING OF THE HORSECLANS. [Brute strength and cunning are needed to form and hold together a strong Confederation of loyal nations in the first ordered state since the cataclysm. Now the leader of the Northern Kingdom must control warring factions in his own farflung empire if he is to stave off the barbaric forces of savage outsiders who threaten the existence of the new civilization.] A third title in this series will be on our next list of books.

AMIS, Kingsley
THE ALTERATION
Viking/Jan./\$7.95

A uchronic or alternate universe story by a well-known mainstream author. Today, in an England that might have been, had Henry VIII never come to power, a Requiem Mass is being held for the late King, Stephen III. The angelic voice of young Hubert Anvil, boy soprano, attracts the attention of the Holy Office and tends to make the probability of his line of succession rather small. The author, a former Angry Young Man, will be remembered (by readers of SF) as the author of NEW MAPS OF HELL, an introduction to the field that did much to improve critical opinion outside it, and co-editor of the SPECTRUM anthology series. There have been extremely good reviews for this book on its recent British publication.

ANDERSON, Poul
MIRKHEIM
Berkeley-Putnam/Jan./\$7.95
(Technic Universe)

See description in GALILEO number one. Apparently this novel incorporates "Lode-star" and continues the story.

BALLARD, J.G.
HIGH-RISE
Holt, Rinehart & Winston/March/\$6.95
(First published by Jonathan Cape, London)

The inhabitants of an ultra-modern urban apartment complex, a self-contained 'civilized' community with all the amenities at hand, degenerate into savagery when the routine irritations of high-density living reach a critical mass. Isolated incidents of hostility escalate into tribal warfare, ending in total destruction. A parable of human violence and regression under stress not dissimilar in effect from Golding's LORD OF THE FLIES or the other novels of J.G. Ballard.

BENNETT, M.S.
THIEF OF JEWRAL
Laser/Mar./\$1.25

[The hunt is on! The quarry—Romer Chane, a cynical child of the streets. Terrified and bewildered, he scrambles across the terrain in a desperate bid to escape the vengeance of the Patrol and the strange avenues of his own brief past. But the Patrol pursues him relentlessly. For, unknown to Romer, the future of the galaxy lies within his memory, and more than one force seeks to unlock its secrets.] New Author.

The Aleph

**BENFORD, Gregory & EKLUND, Gordon
IF THE STARS ARE GODS**

Berkley-Putnam/Mar./\$7.95

Sometimes a little information is worse than none at all. It should have been simple to find out what this forthcoming novel is all about by reading the two currently available stories whose revised versions will be included. Such did not prove to be the case. *IF THE STARS ARE GODS*, the one which was published first (and incidentally, won a Nebula for best novella of 1974) has to do with aliens who visit the solar system on a sort of religious pilgrimage, seeking audience with our local deity, the Sun. "The Anvil of Jove", a novella in the August 1976 *Fantasy & Science Fiction*, has a central character in common but it would appear to take place at an earlier time, before the arrival of the aliens. A message has been received but not translated, although it seems clear enough that the beings that sent it evolved from a Jovian-type planet. So "Anvil" is about an expedition to Jupiter, where it is hoped that similar beings to the message-senders will be encountered. The latter story seems to have been written as an afterthought. Just exactly how the two are tied together and what the new material (which makes up half the book) will contain, will remain a mystery until March, but it should be worth the wait. Good, solid "hardSF" novels don't come along often. (A third story featuring Reynolds "Hellas is Florida" has just appeared in *Fantasy & Science Fiction*, but I don't know how this fits in either.)

**BISHOP, Michael
STOLEN FACES**

Harper & Row/Mar./\$8.95

The author calls his third novel "A Science Fiction horror tale." On a planet called Texzad, descendants of the original settlers, the Mupbormers, live in a compound isolated from the rest of the community. Lucian Yeadance gets out to learn more about these strange people. What he finds out leads to a chilling climax.

**BLOCH, Robert
COLD CHILLS**

Doubleday/Mar./\$5.95

14 recent (1968-1975) stories from various sources and not previously collected, with autobiographical comment. Bloch describes the circumstances leading to the writing of each story and indicates whether his inspiration came from God—or the devil. (See also *BEST OF FREDRIC BROWN* which was edited by Bloch)

**BONE, J. F. & MYERS, Roy
A GIFT FROM THE MANTI**

Laser/Feb./\$1.25

[The Manti are an exceptional race whose vast knowledge far surpasses that of Man. When a cataclysmic eruption destroys their own planet they flee into the uncharted galaxies of the universe. Like precocious children the Manti examine and manipulate one civilization after another. In exchange for the pleasure and diversion afforded, they bestow a gift on each bewildered population. But to one civilization the unique gift has a devastating effect.]

Drew Whyte

**BROWN, Fredric
THE BEST OF FREDRIC BROWN**

Selected with introduction by Robert Bloch

SF Book Club/Jan./\$2.49

Brown is being "rediscovered". *MARTIANS GO HOME* was reissued late in '76 by Ballantine and *WHAT MAD UNIVERSE* will appear shortly from Bantam.

BUTTERWORTH, Michael (adaptor)

PLANET OF PERIL

(Space 1999; Year 2, No.1)

Warner/Mar./\$1.50

The first book based on the second season of the television show, starring Martin Landau, Barbara Bain and Catherine Schell. Includes a dozen action photographs. As in the first season adaptations published by Pocket Books, these books will incorporate four episodes per volume, set in a "novelistic" framework. Among the adventures in this work is an encounter with the chlorine-breathing masters of the planet Cbrysalis who unknowingly threaten Moonbase Alpha with powerful shockwaves while locked [in the sleep stage of their complex life cycle.]

**BUTTERWORTH, & Michael MOORCOCK
TIME OF THE HAWKLORD**

Warner/February/\$1.50

When questioned recently, Michael Moorcock modestly disclaimed the authorship of this novel. "It's Butterworth's" he said. "The idea was mine, but he wrote it." Nonetheless, Moorcock's name on the cover is likely to be the only reason almost any SF reader would have for picking it up in the first place, unless he is also deeply into the English rock music scene. The protagonists of this apocalyptic jest, apparently the first of a series, are the group Hawkwind, with whom Moorcock has been associated, both as a writer and performer for several years. It seemed inevitable that they would turn up as characters in a Moorcock book (even if he didn't actually write it). In the fullness of time, the prophecy has been fulfilled. Of all the groups who have attempted to fuse Science Fiction and rock, none has done so more consistently, through the imagery of their lyrics, the presentation of their nine albums and the trappings of their stage show. (In other words, it's their schtick). So what could be more natural than for former Hawkwind synthesizer wizard Del Dettmar to (create an electronic device that adds vibrations to their music which cut off the Ray that is oppressing mankind, thereby making our lovable freaky friends humanity's last hope?) Here within these pages are Baron Brock and "his sleek and tawny guitar Godblaster", Count Motorhead and his "trusty Rickenbacker bass Gut-splitter", Lord Rudolph the Black and his "greatbass called Boneshiver", which all men and all women loved" and even Moorlock, The Acid Sorcerer! A short spell and the sequel QUEENS OF DELIRIA will be in our midst. (For is it not written that The Hawklords shall return?) First published in 1976 by Aidan Ellis (UK).

**CHANDLER, A. Bertram
STAR COURIER**

(Grimes Series)

Daw/Mar./\$1.25

Chandler, an Australian merchant seaman

by profession, was a contributor to the "golden age" of Campbell's *Astounding* where his classic short novel "Giant Killer" appeared. Most of his 30 novels and numerous shorter works concern a character, John Grimes, patterned on C.S. Forester's famous seafarer, Hornblower. In this episode [Grimes, cashiered out of the Interstellar Federation's space navy, and not yet embarked on his career as a commodore of the Rim Stars, takes a chore delivering a special mail packet from one world to another—and the sexy post-mistress insists upon coming along. But they are space-napped by the inhuman Sbaars and taken to a human world held captive by these spacefaring insects. Grimes is able to undo the damage and deliver his mail only by taking the role of god—and making everyone believe it!]

CHERRYH, C.J.

HUNTER OF WORLDS

SF Book Club/Mar./\$2.49

This is the third novel in a year from the writer who is almost certain to win the John W. Campbell Award for new talent at the World SF Convention next Fall (And there are more to come!). Caroline Cherryh teaches Latin (I think) in a high school in Oklahoma City. Her first encounter with either Fandom or her fellow SF professionals was at this year's Mid-American. This book is set in the distant future on a far-off world, where Man is only one of several intelligent beings (perhaps the least significant) co-existing in a complex hierarchy. The story involves a debt of honor and a duel. A Daw paperback is due in '77.

CHESTER, William L.

ONE AGAINST THE WILDERNESS

(Kioga Series No.2)

Daw/February/\$1.50

The Kioga series of 4 novels made their first appearance in the pulp magazine Blue Book in 1935, but only the first was published in book form. Don Wollheim reprinted this during his tenure at Ace Books and long desired to do the same with the others, but the whereabouts of the author were unknown. At length, his widow was found living in modest circumstances in a remote rural locale and little time was lost before KIOGA OF THE WILDERNESS saw print again. (Kioga the Snow Hawk, is an American Tarzan, the son of white explorers wrecked on the shores of Nato'wa, an unknown volcanic land in the unexplored North. Raised by natives who are the ancestors of American Indians, his adventurous life is full of primitive peoples, extinct beasts and jungle perils.) The final novel, KIOGA IN THE UNKNOWN LAND, will be published by Daw later in 1977.

CLAYTON, Jo

DIADEM FROM THE STARS

Daw/Mar./\$1.50

Josephine Patricia Clayton is yet another talented newcomer to the Daw line. She has worked in a peach cannery, was a library clerk, graduated from USC (Los Angeles) magna cum laude, and now teaches in New Orleans. [The fire of a crashing spaceship opens this unusual novel of an alien world and of a girl who was only partly human—for that wrecked vessel brought with it the

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stolen crown of power of an alien species—and when that diadem affixed itself to her head and mind, it started a chain of exotic fantasy adventures that had to lead ultimately to a rendezvous among the stars.] New Author.

COLE, Adrian
BANE OF NIGHTMARES

(Third in the Dream Lords Series)
Zebra/December or January/\$1.50

An example of what has come to be called by some, albeit jocularly, the 'sword-and-planet' genre, this is another cliffhanging installment in the saga of Galad in which Burroughs-like adventure is mixed with elements of other kinds of fantasy. The Dream Lords are benevolent despots who rule the solar system through the use of mind control, hallucination, etc. Our hero, Galad, a member of the elite, learns of the reality behind the illusions and becomes a rebel, with perilous consequences.

CRAVENS, Gwyneth & MARR, John S.
THE BLACK DEATH

(formerly titled *PLAGUE*)
Dutton (Thomas Congdon)/Jan./\$9.95

Worried about swine flu? Things could be worse, you know. Just how bad they might become is the topic of this timely depiction of Manhattan in the throes of an epidemic of bubonic plague. Another book with the same theme (and former title) was published earlier this year by Belmont Tower. The description of *THE BLACK DEATH* given in Dutton's catalog brings to mind as well Leonard Lewin's *TRIAGE* and *TIME OF THE FOURTH HORSEMAN*, the recent novel by Chelsea Quinn Yarbro.

DALEY, Brian (F)
THE DOOMFARERS OF CORAMONDE

Ballantine-del Rey/March/\$1.95

This is the first new fantasy title to be published under the 'del Rey' imprint. The cover blurb reads [Prince Springbuck was the rightful heir to the throne—but a treacherous wizard had other ideas!] Wish we could tell you more... New Author.

DANN, Jack
STARHIKER

This novel was announced for publication by Bobbs Merrill and is listed in their winter catalog. However, the author has withdrawn the book from Bobbs. Apparently, he actually bought it back. At last word *STARHIKER* is now scheduled to be published in May by Harper & Row.

DENAERDE, Stefan
OPERATION SURVIVAL EARTH

translated from the Dutch
Pocket Books/January/\$1.50

[A strange invitation from interstellar visitors takes an incredulous weekend sailor on a visit to a dusky green planet. A planet of robot factories and perfect justice, whose infinitely superior beings watch the Earth and wait... for the moment when mankind will choose between doom and eternal survival!]

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DICK, Philip K.
A SCANNER DARKLY

Doubleday/January/\$6.95

SF Book Club Alternate/April

'Happy' is the cover name Bob Arctor, a drug-user himself, adopts as a paid police informer on the political and narcotics underworld of a not-too-distant future repressive society. When 'Happy' is given the assignment to monitor the activities of Arctor, the informer confuses the pursuer with the pursued, eventually coming to believe in the reality of both, and not to know which one he is. Interest in Dick has been stimulated by Paul Williams' recent article in *ROLLING STONE* in which *SCANNER* was highly praised. It is generally considered by insiders that this will be Dick's 'breakout book' the one likely to propel him into the status of a cult figure outside the field (as, for example, Vonnegut) more for the intensity of his vision than for specific literary output. Then again, this nightmare of the ultimate crisis of identity is more likely to be appreciated by those who share the endemic paranoia of the drug culture. It is Dick's fervent hope that no one who reads this book will "ever drop dope again." In a searching interview in the current (19th) issue of *SCIENCE FICTION REVIEW*, he speaks on this subject and adds, "I believe that *SCANNER* is a masterpiece. I believe it is the only masterpiece I will ever write... because it is unique."

DICK, Philip K.
THE BEST OF PHILIP K. DICK

Edited by John Brunner
Ballantine/March/\$1.95

EKLUND, Gordon, see BENFORD

FOSTER, Alan Dean
ORPHAN STAR

Ballantine-del Rey/March/\$1.50

This appears to be a sequel to the author's first novel, *THE TAR-AIYM KRANG*. [One man in the universe held the key to the mystery of Flinx's parentage... and that man was trying to kill him!] More next issue.

GEROLD, David
MOONSTAR ODYSSEY

(Jobe Trilogy No. 1)

NAL/February/\$1.50

The author considers the 'Jobe Trilogy' to be different from all his previous work. He describes a totally artificial world with sympathy: everything is "sweetness and light." Gerold dislikes stories in which a lone maverick "overthrows a rigid society under a dome." He prefers his central characters to be people who have grown up within their culture and are fairly typical products of it, not born rebels. He is more interested in ethical and moral dilemmas than standard 'heroics.' On a planet transformed by exiles from Earth, the science of genetics is highly developed. Everyone is female until puberty, at which time they can choose the sexual identities they will have for the remainder of their lives. This book introduces the protagonist for the entire trilogy, who elects a female role. In *A TOSS OF FACES*, she takes a lover. The concluding novel, *A SKY OF PAPER* examines the effect on her and her world of the re-establishment of contact with lost Earth.

GOLDIN, Stephen & SMITH, E.E. "Doc"
A CLOCKWORK TRAITOR

(The Family D'Alembert series: number 3)

Pyramid/January/\$1.25

The succession of Earth's Empire is threatened when an unknown fanatic attempts to assassinate the Princess during a festival with a time-bomb. It is up to agents Jules and Yvette D'Alembert to discover which of three suspects is behind this terrifying galactic conspiracy. *GETAWAY WORLD*, fourth in the series, follows shortly. Another projected series by Smith, "Lord Tedric" will be completed by an author, not Goldin, yet to be determined, and published by former Pyramid vice-president Norman Goldfin's new company, Baronet Books.

GOULART, Ron
THE PANCHRONICON PLOT

Daw/February/\$1.25

More slapstick satire from a prolific entertainer. [The President of the United States is kidnapping his political enemies and sending them to exile in the far past! This is a case for Jake Conger of the Wild Talent Division in 21st Century America. He must find another man with a time-machine in order to go back and rescue the stranded politicians!]

CRACKPOT

Doubleday/March/\$5.95

"Crackpot" is the electronic wizard and supposed inventor of a Gadget that can subvert every kind of robot, android and servomechanism. Rafe Santa is hot on his trail when he is sent by his employer to report on the Mexican-American War instead. Rafe sets out, little suspecting that he has become a walking bomb, or that the mysterious Crackpot is up to his circuits in everything! The possibilities are explosive...

GREEN, Martin
THE EARTH AGAIN REDEEMED

Basic Books/January/\$10.00

In this story of [two parallel worlds, one a dark and brooding seventeenth-century-like Africa and the other a barren moonscape of post-nuclear holocaust Massachusetts], a well-regarded literary critic tries his hand at something new. But will it be familiar to us?

HARRISON, Harry
SKYFALL

Atheneum/January/\$8.95

(Previously pub. by Faber in Eng./1976)

[This novel portrays the terror of global catastrophe, when the largest spaceship ever made threatens New York, London and Moscow with a falling mass of lethal, radioactive fuel. Inside the satellite, the six crew members—American, Russian, black, white, male, female—are locked together with their fears and frictions. Down below, heads of state and scientists battle time and the pressures of world opinion, in an effort to avert the greatest disaster man has ever known.] Seems to be getting the marketing treatment of a potential best-seller.

HERBERT, Frank
THE DOSADAI EXPERIMENT

(sequel to *WHIPPING STAR*)

Galaxy/Mar. to June

Berkley-Putnam/?

The Aleph

The best-selling author of the "Dune Trilogy" returns to the baffling universe of jumpdogs, Tapisrots, Calebans and the Bureau of Sabotage. The March issue of GALAXY will feature an article by Herbert outlining the background for this intriguing series and its sociological implications.

HODDER-WILLIAMS, Christopher THE PRAYER MACHINE

St. Martin's Press/February/\$8.95

[There is such terror in Neil Prentice's mind that he drives to Norton, the modern scientific complex, to rid himself of a tormenting idea and to quell the voices which rage inside him. But the psychiatrists there are violently divided about his condition. Is he simply mad, or does Prentice really understand the appalling consequences of the genetic engineering being carried on at Norton? Is he in fact, the first person ever to pass through a celestial black hole? . . . The strange connection between one man's schizophrenia and a laboratory's terrifying discoveries can tip the scales to discovery or destruction.] Published in 1976 in England.

HOLLY Joan Hunter

SHEPHERD

Laser/February/\$1.25

(Sequel to KEEPER)

[No laughter, no tears, not even a smile passes across the faces of the populace. They are doomed by an omnipotent technology, sentenced to existence without human emotions. Through his love for Peter, a mentally defective child, Frederik Dainig is able to recapture his feelings and thwart the Anti-Emotion Conditioners. Bearing the highest of all emotions, love and compassion, Dainig sets out to destroy the society that is destroying man.]

HUGHES, Zach

PRESSURE MAN

Laser/March/\$1.25

[The most complex problem ever faced by man—an Earth over-populated, a food supply nearly exhausted, and a colossus of a spaceship, more powerful than any ever conceived—built to erase the chilling prospect of Earth's demise. Who is the hidden enemy, determined that the sleek giant will never make her maiden flight? And how to stop the sabotage? Dominic Gordon, ship captain and top space engineer, must find the answers . . . or die trying.]

JONES, Raymond F.

THE RIVER AND THE DREAM

Laser/January/\$1.25

[All his life Manvar has had a dream. One day, he will escape the harshly primitive, blizzard-torn lands of the north. He will follow the paths of the Ancients and see for himself the fabled lands of the south: lands without ice and snow, where it is not perpetual night, but where there is warmth and light, and life is easy and comfortable within walled cities of incredible beauty. Manvar follows his dream, but finds it hollow. Life in the wondrous city of Delphos is not the paradise it seemed.]

KANGILASKI, Jaan

THE SEEKING SWORD

Ballantine/February/\$1.95

The principle figure of this novel is a
Drew Whyte

corrupt shaman endowed with truly monstrous vitality and charisma who comes into possession of or is pursued by a sword of vengeance with a life of its own. "A loveable old character" was editor Lester del Rey's affectionate evaluation of him at the recent Fantasy Convention in New York. Wish we could tell you more..... New Author.

KERR, Michael THEY CAME FROM BELOW

Laser/March/\$1.25

[Out of the stars screamed a spaceship, shuddering, landing, disgorging its human cargo. They sought a new land and had much to give. But, one by one, they dropped in the deepening silence and soon, only the guardians of the future remained. Eons later, Long Arm's tribe, cold-huddled and hungry, follow the guardians to the depths of the earth. The icy land is once more silent, but the strange rendezvous will alter the course of history.] New Author.

LEE, Tanith DRINKING SAPPHIRE WINE (sequel to DON'T BITE THE SUN)

Daw/January/\$1.25

In a short span of time Tanith Lee has become one of the most popular authors on the Daw list, chiefly for her long fantasy epics, THE BIRTHGRAVE and THE STORM LORD. This is her second SF venture, a return to the ultra-far future wonderland of FOUR BEE, a programmed society where anything goes . . . except . . . Her nameless protagonist is one of a class of spoiled adolescents, the Jang, whose almost lives of perpetual leisure are an endless quest for new thrills and instant gratification. The Jang think nothing of changing sex or physical form and when things get dull, suicide is okay, because the robots always bring them back to life. But for one among them, this existence palls. He/she rebels, and finally succeeding in committing the one illegal act, becomes an exile from utopia.

LEIBER, Fritz OUR LADY OF DARKNESS

Berkley-Putnam/February/\$7.95

(Serialized as THE PALE BROWN THING)
Fantasy & Science Fiction/Jan.-Feb. 1976

This is Leiber's first novel since A SPEC-TER IS HAUNTING TEXAS, nearly ten years ago. Set in present-day San Francisco, it is [a subtle and elegant story that investigates the arcane point where technology, mystery, science and horror meet.] As in his classic "Smoke Ghost" Leiber imagines what form supernatural evil might take in a contemporary environment. Are there "paranormal entities", [vicious demons related to urban design and engineering]? This is the conclusion reached by Franz Westen, a writer of occult fiction now living alone and recovering from a drinking problem, when he is haunted by a faceless apparition and other eerie phantoms that appear to menace his sanity. The only clues Westen has to the phenomena are two rare books: one, he comes to believe, is the diary of Clark Ashton Smith, the other, a tract called "Megapolismancy" by a strange, flamboyant, evil man, under whose vengeful curse both Smith and Westen were doomed to what?

THE RIME ISLE (Fafhrd/Grey Mouser-series)

Cosmos/March & May

In all probability, this will form part of the contents of a new book provisionally titled SWORDS AND ICE MAGIC, but, since, as of this writing, a contract has not been signed, no more may be divulged.

LEM, Stanislaw MORTAL ENGINES

translated from the Polish by M. Kandel
Seabury Continuum/March/\$10.95 ?

There are seven previous books by Lem in English, all but two of them published by Seabury. The recent front-page comprehensive review by The New York Times book section (by Theodore Solotaroff of The New American Review) seems to have stimulated new interest in this increasingly important Polish writer, who is a very controversial figure here within the SF field itself, perhaps due in part to his unsparring opinions of it. His most articulate supporters, Darko Suvin and Franz Rottensteiner, both share with Lem elements of a greatly different cultural background. This new collection offers another perspective, that of his National Book Award-winning translator, Michael Kandel, who supplies a publishing history and critical evaluation. Among the fiction to be found in MORTAL ENGINES, which brings together some of the best of Lem's shorter works on the theme of artificial intelligence, are the tragic short novel, "The Mask" (a variation on the Frankenstein theme) and, in a light vein, the "Fables for Robots" cycle which [blends SF, slapstick, philosophy and satire].

LONGO, Chris THE LAST GENE

Major/Dec. '76 or Jan '77/\$1.25 or \$1.50

A promising experiment by the famous Beverly Hills geneticists, Drs. Hans and Helaine Anderson, goes astray when the test-tube baby they have 'created', whose every gene and chromosome have been preselected to produce the perfect infant, begins weirdly to transmogrify. The "darling of the scientific world" has suddenly become a monster. A first novel by an actor, playwright and professor of theater arts. New Author.

LORD, Jeffrey

THE FORESTS OF GLEOR (Richard Blade Series No. 22)

Pinnacle/January/\$1.25

The present unpredictability of what began as a strictly formula fantasy-adventure series with an all-purpose hero (something of a mixture of Conan and James Bond) is due to the resourcefulness of Roland Green, who has been "Jeffrey Lord" since the publication of KINGDOM OF ROYTH (Blade No. 9) in August, 1973. Green now makes his living as a writer. Under his own name, he is the creator of Wandor, the hero of another sword and sorcery epic, of which two books have seen print from Avon. Although Blade always begins his forays into Dimension X naked, immersed in instant peril, there is no telling where or when he is likely to find himself. Recent episodes have taken him to a super-scientific city-state and analog of medieval Japan. Green is a student of political science and a history

buff and is able to turn these interests to good advantage in the series. In *THE FORESTS OF GLEOR*, Blade thrown into the hereditary conflict between two hostile empires in the world of Trawn. He encounters [a beautiful princess being captured by a grotesque army of giant crawlers. When Blade tries to rescue her from a mad king's harem, he himself is captured and imprisoned... and must face his most horrifying opponents, the spider-beasts!]

EMPIRE OF BLOOD (F)

(Richard Blade Series No.23)

Pinnacle/March/\$1.25

[Landing in an island dimension, ruled by a tyrannical emperor (modeled on Dracula's historical prototype, Vlad the Impaler), Riebard Blade finds himself involved in a plan to depose the ruthless monarch. When the plot is uncovered, Blade is sent to the galleys as a slave. Soon, he is on the losing side in a battle with pirates, but escapes, meets a beautiful princess and spends the rest of his eventful sojourn in attempting to return the rightful heir to the throne.]

LUCAS, George

STAR WARS: FROM THE ADVENTURES OF LUKE SKYWALKER

Ballantine/December, 1976/\$1.50

Lucas, the director of *THX 1138* (the imaginative low-budget SF film), and his associates were sitting around a hotel room during a lull in the making of *American Graffiti* when someone said, "Hey, wouldn't it be great if there were a good honest SF flick around, something like *Flash Gordon*, only with modern effects?" And Lucas said, "Why not do it ourselves?" and they did. The movie opens on Memorial Day, 1977(?). If the advance presentation given at Kansas City is any indication, they have a winner. This is the first SF movie I know of which was made by science fiction fans who actually read the stuff. It has a good, honest unpretentious plot which everyone who has read any space opera should instantly recognize. That of course may be the problem with the novel version. Still, the movie should be worth waiting for. I am especially looking forward to seeing Sir Alec Guinness as Ben Kenobi... and then there's the villainous Darth Vader... and the two robots... and the tough but lovable 'wookie'... and Peter Cushing... and the princess and the battle on the Death Star... and... A sequel will be penned by Alan Dean Foster; there will be a book on "The Making of ...", Comic books, T-shirts and

LUPOFF, Richard A. (F)

SWORD OF THE DEMON

Harper & Row/February/\$7.95

Lupoff is one of the bardest-working professionals in the field today, although he is not yet a 'name' to sell books. His best regarded work is probably "New Alabama Blues", originally published in AGAIN, DANGEROUS VISIONS and due in an expanded version from Dell later in 1977. He is also known as the author of the "Ova Hamlet" pastiches and "Sail the Tide of Mourning" and its sequel, both Hugo Award nominees. Lupoff reviews SF regularly for *Algol* and has written six previous novels, no two of them alike. The present

book is an off-trail fantasy which appears to do for the mythology of ancient Japan much the same sort of thing that Roger Zelazny did in *LORD OF LIGHT* and *CREATURES OF LIGHT AND DARKNESS* for respectively, that of India and Egypt. [In the silent "darkling void permeated with primal matter", two figures, neither man nor woman, whirl and attract and struggle until energy sparks and life is created. The yellow figure, an androgynous, flees this void through the heart of a massive rock, and it transforms instantly into woman, the Kishimo.] This is the start of a phantasmagorical odyssey through an exotic landscape filled with gods, giant spiders, talking serpents, and all manner of strange intrigue.

McCAFFREY, Anne (J)

DRAGONSLINGER

(Manuscript tide — HARPER OF PERN)

Atheneum/March/\$7.95

(juvenile) This is a sequel to last year's DRAGONSONG, which introduced a peripheral character for younger readers into the popular sequence of novels Anne McCaffrey has written about the world of Pern. The crypto-medieval society of this distant planet is periodically menaced by Threads, a strange form of life that can only be repelled with the help of mutated telepathic 'dragons'. Menolly is a girl living in one of the lesser strongholds under the protection of the dragonriders. When she declares her intent to become a harper, one of an elite class of troubadours, solely the prerogative of males, she is given no encouragement by her father, despite her evident musical talent. At last she runs away from home, seeking to achieve her dream elsewhere. This enables Anne McCaffrey to weave additional threads into the background of her tapestry and leads directly to the events with which this new story begins.

McELROY, Joseph

PLUS

Knopf/January/\$8.95, \$3.95 paper

McElroy is an avant-garde mainstream writer with a growing reputation. He is the author of four very long novels, the last of which, *LOOKOUT CARTRIDGE*, an enigmatic quest for a mysterious film, deployed scientific metaphor somewhat in the manner of Pynchon. This book is, by any standard, Science Fiction. (Even the publisher says so). PLUS is [the meditation—the experience of a disembodied human brain, trapped in a solar energy experiment, orbiting the earth in a capsule. It is programmed to transmit information. But soon it begins to develop a consciousness apart from its function—begins to withhold information, to play tricks, to grow strange, terrifying, oddly beautiful appendages: limbs, nerves, forms for which there are no names, forms spontaneously erupting from its thoughts (and new feelings)—begins to develop and refine a plan of its own...]. One of these days someone from outside the field is going to write a book which is acknowledged as a masterpiece both within it and without. Maybe, just maybe, this could be it. Note that there are simultaneous bard and soft editions.

MARCUS, Robert B. Jr. SHADOW ON THE STARS

Laser/February/\$1.25

[As a telepath Camarch is despised by humanity. Pursued by the authorities for a crime he didn't commit and haunted by a paralyzing alien force he finds himself aboard the starship Birmingham. To his horror he learns he has been virtually kidnapped from his time and place to play a role for in the future. Amid the mind-bending ruins of C'bah Lai, Camarch discovers that juggling the future has devastating ramifications for the past.] First Novel.

MARR, John S., See CRAVENS

MOORCOCK, Michael THE WEIRD OF THE WHITE WOLF

(Elric Series No.3)

Daw/March/\$1.25

Although most of the material in this new Daw series has been previously published, all of it has been thoroughly re-worked by the author. This is Moorcock's definitive final version of the Elric saga, in chronological sequence. Elric, an obsessed albino despot, is the most notable character in recent heroic fantasy and no lover of the genre is likely to want to be without the complete set. The third volume incorporates the revised "Stealer of Souls" and two episodes from *THE SINGING CITADEL*. In this book [Elric realizes at last the real super-scientific and magical power of his sword, Stormbringer. By its aid and without it his own volition, it brings devastation to his usurper and to the princess who was Elric's betrothed], thus, in true doom-laden fashion, propelling him towards a predestined end, as yet unknown. . .

THE CORNELIUS CHRONICLES (C)

(The Final Programme & A Cure for Cancer & The English Assassin)

Avon/March/\$2.25

Nothing would seem further away from the epic universe of Elric than the trendy world of Jerry Cornelius. This superficial response, however, neglects to take into consideration Moorcock and (New Worlds) company's calculated attempt to create a hero for our times: "a new myth", in the words of Dave Hartwell, "from the imagery of popular culture". From this perspective, perhaps the two are not so dissimilar. JC is dated now but his status as pop archetype seems assured. Almost no fictional character more vividly evokes the zeitgeist of 1968, when the first (and best-known) of these three novels was originally published. Despite his amorphous nature, JC had a sufficiently identifiable image that a whole book of "jerrycornelius" stories (THE NATURE OF THE CATASTROPHE British publication only) could be written by other writers. There has been a film based on THE FINAL PRO-GRAMME (they called it "The Last Days of Man on Earth" over here). This book would seem to be the last word were it not for the fact that one final book, THE CONDITION OF MUZAK, has just been published in England. Is this SF? Well, the publication of these novels within the context of Science Fiction (if not always with the label) did much to change the nature of the field.

The Aleph

When Gregg Press included THE FINAL PROGRAMME in its second series of "Classics" the choice did not seem to be an error.

MOORCOCK, Michael, See Butterworth, M.

MORRESSEY, John
THE EXTRATERRITORIAL
Laser/January/\$1.25

[Everyone knows the extraterritorials protect the Association's interests outside the Barrier, though no one really understands how. Even Martin Selkirk, an extraterritorial himself, has only a hazy idea of his work. And that is how the Association likes it. But Selkirk begins to dream—ugly, terrifying images that grow more and more vivid, no matter how hard he tries to subdue them. Slowly, Selkirk realizes he is not dreaming. He is remembering—hideous atrocities that he himself has committed in the name of the Association. And Selkirk is determined to win his revenge.]

MYERS, Roy, See BONE, J.F.

NELSON, R. Faraday
THE ECOLOG
Laser/January/\$1.25

[He is lost; the Corregidor is disabled and its energy tanks are nearly depleted. The ship is being pursued by the hostile Loms. Yet Commodore Abraham Briggs has not lost hope. Beneath him lies a strangely beautiful world. And from it he may receive help—refuel his ship, find his bearings and plot his course home. But the Ecolog, masked ruler of a feudal empire, has other plans, and on this remote and contradictory planet, she is omnipotent.]

NORMAN, John
SLAVE GIRL OF GOR
(Gor Series No. 11)
Daw/March/\$1.75

[John Norman summarizes the story himself as follows: "Judy Thornton, a young, dark-haired coed, awakens to her horror in an alien wilderness, unclothed and chained by the neck. She is on Gor. She does not understand where she is, or what she is doing there. Unknown to herself she carries a message crucial for Kurii agents, a message which has been hypnotically implanted in her brain to be released under post-hypnotic stimuli. . . . Both Kurii agents and those of Priest-Kings, headed by Tarl Cabot, understand that she bears a vital secret, and accordingly she is sought for and fought over by both. . . . It is not merely an adventure story, an exciting romance, and an advancement of the plot structure of the Goran saga, but also a detailed and rich psychological study of the transformation of a girl into a woman, in a world in which men exist."]'

PARRY, Michel
CHARIOTS OF FIRE
Popular Library/January/\$1.50

Is this the forgotten history of the world, the true story of Mankind? This novel, the first of a trilogy, is an example of what seems to be a growing sub-genre of fiction inspired by the writings of Erich von Daniken. Late in the 19th century, we are told, a little-known and highly unorthodox French scholar came upon, in a cave adjacent to the Inca ruins of Tiahuanuco, "a book of incalculable antiquity", to the translation of which he devoted the remainder of his life. The Giraudoux Manuscript, as it came to be known, was never published. Its contents are divulged for the first time here, in the form of a tale of adventure. Many thousand years ago, the way of life of a primitive culture was disturbed by the advent of strange beings from other worlds. This is the story of Boaz, a simple hunter who became a friend of the Gods and the leader of his people, and sought, through a perilous quest, to deliver them from an alien bondage. The trilogy is the joint work of Michel Parry and Gary Rusoff, but the authorship of the first book is credited only to the former. Parry, a young Englishman, is chiefly known as an anthologist of supernatural fiction several of whose books have appeared in this country from Taplinger. CHARIOTS OF FIRE was first published in 1974 by the British firm Futura Publications, as an Orbit book.

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PLATT, Charles
TWILIGHT OF A CITY
Macmillan/March/\$8.95

Macmillan's catalog copy states that Charles Platt is the author of nine books, but the only one with which I am familiar is a novel called GARBAGE WORLD. At any rate, Platt has written numerous short stories and poems, was a former editor of New Worlds and once handled the Science Fiction line at Avon. This novel, which may or may not be the same as THE CITY DWELLERS (an earlier title published in England by Sidgwick and Jackson in 1970), was previously scheduled to appear from the present publisher as DEVOLUTION. In marked contrast to the usually expressed attitude of writers in the field, Platt has apparently stated that he wishes this work to be regarded not as speculation, but as prediction. American urban society at the end of the twentieth century is in crisis. There is massive discontent and unemployment, which eventually leads to total economic collapse. The central character of at least one of the three segments that make up the book is a "super-rich rock singer". Is this the end of civilization as we know it?

POURNELLE, Jerry
THE MERCENARY
(CoDominium Series)
Pocket Books/February/\$1.75

The setting for the popular MOTE IN GOD'S EVE was not Larry Niven's 'Known Space' but a universe created by co-author Jerry Pournelle. Those who were intrigued by the background of that novel (and are not regular readers of Analog where the contents of this book first appeared) have here an opportunity to learn more of earlier events in his 'future history'. Hero of the three episodes that make up this collection is John Christian Falkenberg, officer in the Space Navy of the CoDominium, the planetary government created in 1990 as a result of treaties between the United States and the Soviet Union. Included in addition to the title story are "Peace With Honor" (Pournelle's first published fiction title) and the former two-part serial "Sword and Spec-

er". (Falkenberg is also a character in the recently published Laser novel WEST OF HONOR.) Another collection of Pournelle's shorter fiction HIGH JUSTICE is currently on Pocket Books' schedule for May and the next collaborative novel with Niven (LUCIFER'S HAMMER) should appear from Playboy Press in June.

QUINN, Seabury
THE HORROR CHAMBERS OF JULES DE GRANDIN
(6th & final of series ed. by R. Weinberg)
Popular Library/February/\$1.50

The compiler of this regular feature attempts to keep himself informed about a wide range of contemporary literature, including the genres of supernatural horror and occult fantasy. Since this is a Science Fiction magazine and space is limited, books of this nature will not ordinarily be listed in 'The Aleph'. There are, however, times when a publisher will mislabel such a book as SF. It seems only fair to call such occasions to the attention of a prospective reader. This is the case with the present book and the five other titles in the Jules de Grandin series. By no possible stretch of the imagination would I term the adventures of "the occult Hercule Poirot" Science Fiction. Although certain among the good detective's adversaries may be encountered in our genre, these stories are all from the pages of 'Weird Tales' and are quintessential examples of their kind. But why call them otherwise, morbleu? They are good fun for those who know what they are buying. Perhaps this is overkill. Any tête de mouton ought to be able to tell from the copy or the DiFate covers what these books are about. Ça suffit!

RENDAR, Joseph
THE MONODYNE CATASTROPHE
Major/Jan. or Feb./\$1.25

[Set well into the future, when Earth has colonized Mars and the Moon. Every source of energy is concentrated within the super-computer, the Monodyne. The descendants of the American Indian decide to take it over, to restore America to the Indians. When the lights go out . . . the President has other ideas—and they're not pleasant.] A Watergate of tomorrow relieved by touches of whimsy and black humor. Joseph Rendar has had stories in Venture, Amazing and Fantasy & Science Fiction. He is also a playwright. His "A Boy Named Dog" was a winner of the Village Voice Off-Broadway Award for Best Play of 1973. Features an introduction by Barry Malzberg. First Novel.

REYNOLDS, Mack
POLICE PATROL, 2000 A.D.
Ace/February/\$1.50

Another in Reynolds' steadily growing series of profiles of the world at the turn of the next century, this is a [look into the everyday life of a twenty-first century policeman]—an 'Adam 12' of the future. Incorporated in the novel are two previously published short stories from Analog and Galaxy. EQUALITY IN THE YEAR 2000 will be published in May as an Ace Special.

Continued on page 92

GALILEO 89

Reviews



CINNABAR

by Edward Bryant
MacMillan, \$7.95.

Reviewed by Floyd Kemske

Writing in the tradition of Harlan Ellison's interminable fund of *Dangerous Visions*, Edward Bryant offers a new collection of unconventional short stories aimed—just above the thalamus—at the cerebral cortex. And, in that same tradition, Bryant's aim is slightly off, so that he invariably strikes the thalamus a glancing blow. *Cinnabar* comprises eight of Bryant's stories in and about the city of the same name, a place of numberless alternatives for its inhabitants...a place where people do what they want to do when they want to do it.

The infinitely diverse setting of *Cinnabar* itself (don't ask "where" or "when" about a city at the center of time), is the one way in which all the stories overlap. But there are several common themes, such as the intermittent and cumulative madness of *Terminex* (*Cinnabar's* omnipotent computer), which produce a synergistic

reaction. *Cinnabar*, here, goes beyond being just a collection of stories and begins to read like a novel.

Like rainbow colors in a faceted gem, characters flash into existence and pass out of sight. Timnath Obregon, the "eclecticist," appears successively as an uncle to a four-year-old child, inventor of a device to edit time, the "friend" of Tournaline Hayes ("Network sex star"), and, ultimately, savior of the city. The characters, however unlikely, are believable—which is not to say they are genuine. The reader never knows who might turn out to be real and who, like Wiley Cafter (the Tin Man in this story) might be a simulacrum. Now that I think about it, however, I wonder if they aren't all simulacrae. The conclusion certainly fits with Bryant's appreciation of ambiguity and sense of cosmic justice. Who else would cast the primeval shark in the role of champion for humanity?

On one level, *Cinnabar* explores the possibilities of living in an environment of infinite options, as when the pudgy adolescent Mary Eloise

Olvera is transformed into the legendary superwoman, Cougar Lou Landis. On another level, it explores the implications of such an environment...if people can be changed biologically to fill certain roles, will they not also be exploited in those roles? Bryant answers yes in the case of Jade Blue, the computer-designed cat mother—an ideal governess for human children, directed by a memory implant of kittens which never existed.

Bryant is a highly literate writer. (We all have our own measure of literacy: mine is whether or not the author is acquainted with fantods.) His previous collection, *Among the Dead*, was grim in tone and evokes descriptions such as "negative visions" and "nightmares." *Cinnabar* is advanced as a more colorful and affirmative work. "It is the author's hope," reads the publicity, "you'll wish you were in *Cinnabar* rather than where you are now." The author succeeds in his purpose. If you give it enough thought, however, you will still see the nightmares and will feel that *Cinnabar* would indeed be a nice place to visit, but...

SEAS OF ERNATHE

by Jeffrey Carver
Laser, \$9.95.

Reviewed by David Johns

Jeffrey Carver's first published story was in our companion magazine, FICTION issue no.8. Since then we've had the opportunity to read and enjoy more of his work, including this, his first novel.

The story is a mystery about the apparently hostile activities committed against humans by the Nale'nid, the hitherto live-and-let-live natives of Ernathé. Seth Perland, a young star-pilot, struggling with a personal crisis, is commissioned to solve the puzzle of the Nale'nid's actions. It is a puzzle on which the fate of Ernathé's human colony and the fate of the human race may depend. Abducted and taken to the Nale'nid's underwater city, Perland slowly begins to understand the events of the recent past.

What is evident in, Carver's work is a wonderful ability to deal sensitively with the interrelationships of characters and their environment. His first story, "Of No Return," dealt with the emotional turmoil of a man who had become a different kind of human being by living in an undersea environment. In *Ernathé*, Carver is again writing of undersea life and of a race that is distinctly non-human in its viewpoints and motivations. In the best part of the book Seth comes to learn the Nale'nid point of view so well that he almost loses his humanity. The reader sees him alter his thought and behavior so clearly that reader and character breathe in like rhythm.

However, Carver's book is not a total success. It is a mystery in which the culprits, but not their motivation, are known. In the beginning no one, including the reader, knows what is going on or why it is important. The reasons for the humans' concern emerges in bits and pieces that the author seems to expect the reader to pull together into a coherent explanation long after the information has been given. A related problem is that Carver's characters neglect to inform each other, and the reader, of important facts. In a mystery this is known as withholding clues and is not considered fair play.

Where Carver does succeed is in

creating a race and milieu that is not only a good solution to his mystery, but is emotionally effective and believable, something the reader will remember after finishing the book. Carver is becoming a writer who will demand attention in the near future, and it is to everyone's advantage to read *Seas of Ernathé* to get an idea of the quality in Carver's characters, his concise social futurology, and to watch him grow.

ANIARA

by Harry Martinson
Avon/Equinox SF Rediscovery, 1976
Originally published in 1956

Reviewed by A. M. Wineberg

Aniara is considered to be a poem, i.e., a communication of the poetic. But Martinson deals here with didactics, not poetry; though his vision is that of a poet, he is here a teacher and his poem a philosophical treatment of Man and his place in the Universe.

Still, in a sense, all Science Fiction writers are poets; they deal with imagination, analogy, and vision; they erect mirrors in space that bounce back the image we normally lose, the self image; they speak of a future or revise a past and they all have but one topic: Man, now, ever unmindful.

Aniara is of the future as it is of all times, it is our journey and the journey of strangers, it posits a form of transcendence, as we must. *Aniara* is an epic tracing the history of a race lost in the immensity of time and space. On an interplanetary craft thrown off-axis, eight thousand people realize they will never see Earth again. They have lost innocence, and the poem traces their knowing creation of song, God, and culture as they drop into the curved space of loss. Their only consolation is a nightmare: should the race last, it will curve endlessly, repeating itself in nothingness.

While the poem is quite readable, the articulation of Martinson's thought suffers from an occasional lapse in grace. Yet one senses an underlying correctness; perhaps the problem lies in the translation from the Swedish and not in the original poem. In either case, we are presented with one of the classics of Science Fiction in a modern, inexpensive format, and its faults cannot diminish the overall excellence.

If you missed *Aniara* back in the Fif-

ties, do not hesitate to read it now. Insight always has relevance.

BEASTS

by John Crowley
Doubleday, \$5.95

Reviewed by Floyd Kemske

The theme of non-human intelligence in an earthbound context is unusual in Science Fiction; perhaps because it was exploited so masterfully as early as 1944 by Olaf Stapledon (*Sirius*). John Crowley, however, rises to the challenge and in *Beasts* proves there is (or was) something left to say on the subject. Part of a generation of environmentally conscious writers, Crowley helps to bring the attention of the Science Fiction world to the biological sciences. There is nothing in this book of space or of off-world aliens. Aliens there are, but they are earthbound.

There are three types of creatures inhabiting North America of the 2030s: the remnants of the Earth's decimated wildlife, the Leo, a wholly new type of creature brought about by the experimental cellular fusion of the genes of human and lion, and, that most predatory of the Universe's beasts, Man. The "political animal" among these three has built himself a welter of conflicting, overlapping, and petty pseudonations similar to Europe of a thousand years earlier. But Loren Causabon, a clear-thinking naturalist (refreshing in the chaotic setting Crowley has created), opens the story musing that political fragmentation is beneficial to the Earth. It lessens Man's ability to effectively pillage the environment. We readers are gratefully free of Science Fiction's time-worn theme, the political messiah.

I am tempted to recount the novel as an adventure at this point: to write of the odyssey of Painter (a Leo trapped among humans), the coming of age of Sten (young pretender to the leadership of the collapsed Northern Autonomy), the cloak and dagger conspiracies of Reynard (the Fox-Man), and the convergence of their destinies in the struggle for biological ascendancy. I am tempted to write of this book as an adventure story, but to do so would be to underestimate the philosophical importance of it. Crowley appreciates the nature of Man. The title of this book does not refer to Leos.

The confrontation of Man and Leo

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is not an exercise in comparative anthropology. There are not two cultures involved here, for the Leo has no culture. This confrontation is between two species and all the more exciting for it. The theme is timeless: Man Against Nature, but this time the champion of Nature is itself a product of Man's environmental depredations. It is a colossal paradox, but one which is entirely believable and one which makes *Beasts* worthy of serious attention.

* *BEASTS* is dated by internal evidence only: Caubon's recall of the studies of a "great European ornithologist" on the graylag goose, said to have taken place one hundred years earlier. The ornithologist is obviously Konrad Lorenz, the reference date the 1930s. Such care in the construction of his books is an important factor in Crowley's growing reputation.

THE GRAYSPACE BEAST

by Gordon Eklund
Doubleday, \$5.95.

Reviewed by Stephen A. Trimble

Take two parts Doc Smith space opera, one part *cinema verite* nihilism, and a Heinleinian character or two. Add a pinch of psychological mysticism, and a dash of *The Treasure of Sierra Madre*. Stir slowly until a murky colloid forms, and you have *The Grayspace Beast*, an often confusing but entertaining novel by Gordon Eklund.

The plot is simple enough. An aging space-jockey (Kail Kaypack), is wasting away his final days running an amusement-park concession—a spaceship ride—on Paradise Planet, a vacation resort-world which extrapolates Vegas to its absurdly logical conclusion. Kaypack is one step ahead of a shoeshine, and even closer to arrest by the syndicate for unlawful solicitation of tourists. He longs for the comforts and uncomplicated life of deep-space. His prayers are answered when Darcey, a young man raised by aliens, appears with money and the promise of a ship (the *Arjuna*); the only catch: they must venture forth in search of (shudder) the grayspace beast!

With the aid of Veador, Kaypack's loyal assistant (a long-tailed alien who has pledged eternal servitude to his captain), he drags together some semblance of a crew; just the kind of people you'd invite to dinner—if you

travel in underworld circles and are heavily-insured!

Eklund employs a story-telling technique which, although not unique, is quite effective. The tale of the *Arjuna* and its crew is narrated by an old grandfather/Socrates type who relates the story to a group of precocious (and obnoxious) youngsters. Whenever the story bogs down, you can count on at least one of these officious juveniles to interrupt with "Enough of this crap, get back to the story, already!", or words to that effect. The rest of their time is spent guessing the identity of the narrator (Hint: It ain't Kaypack!).

But the most interesting element in the story is the presence of the two Simerians. The Simerians are a fascinating race of humanoids who function alternately as parts of a collective mind and as discrete individuals. Their thought-processes have little in common with those of humankind. They speak an allusive, mystical language with very little semantic content, and when they are in the story, there is an aura of mystery afloat. Unfortunately, they seldom appear, and in the end we know little more than we did originally about their culture and society.

There are far too many unoriginal elements here. Grayspace itself is a concoction of Anne McCaffrey's "between," Captain Kirk's subspace, and the planoforming dimension in Cordwainer Smith's future-history series. For that matter the grayspace beast itself resembles nothing as much as it does the "dragons" in Cordwainer's "The Game of Rat and Dragon." Moreover, Kail Kaypack is himself reminiscent of Heinlein's Lazarus Long, in both his manner and his thinking.

Thematically, *The Grayspace Beast* portrays the conflict between pragmatic empiricism and the mystical realms of illusion and mirage. Methodical logic is pitted against the fantasy-world(?) of the Simerians. Eklund seems himself unsure who holds the correct view; at the story's conclusion, the answer is still unclear, but at least the question has been raised!

Gordon Eklund, at 27, is hailed as one of the shining lights of the 70's wave of science fiction. The accolades are not undeserved; two previous novels and several short stories have gained him a number of awards, in-

cluding the 1975 Nebula for short fiction. Clearly, Eklund is not just another promising young story-teller.

I fear, however, that *The Grayspace Beast* will not advance his cause. There are too many borrowed concepts, too many stock characters, too many questions left unanswered. The style of presentation is intriguing, but the ideas are a bit foggy and laced with *deja vu*. Perhaps in attempting to breathe new life into an old theme-space-jockey v. BEM—Eklund has forgotten that his "innovations" are also used goods.

Aleph cont.—from page 89

ROBINSON, Spider
TELEPATH

Berkley-Putnam/February/\$7.95

Since all that we had to say about this first novel in the last issue had to do with its author, here's a few words about the story. Civilization is brought to an abrupt halt when a well-intentioned but misguided scientist drops a vial containing a virus that has the effect of causing hyperosmia (supersensitivity of the sense of smell) from a New York skyscraper. The city becomes totally uninhabitable, but a few manage to survive in a fortified enclave. Isham Jones, son of the scientist's former black assistant, dedicates himself to tracking down and killing this enemy of mankind. An unexpected and deadly side effect of the virus is to make evident to the senses a species of non-corporeal beings that have always lurked on the fringes of human consciousness (although apparent to animals) and have been responsible for many of the age-old legends of supernatural creatures: ghosts, vampires, demons, etc. These being, now called "Muskees", aware of Man's new awareness, suddenly become overtly hostile and a battle for supremacy ensues which only young Jones can resolve, at the risk of being thought a traitor to his own kind. The first portion of this novel was published in Analog as "By Any Other Name". First Novel.

SHAPIRO, Neil
MIND-CALL
Major/March/\$1.25

The second novel by the author of *PLANET WITHOUT A NAME*, also from Major. [There seemed no shield against the kinetic probe of the Institute of the Worlds. People who returned from space voyages would suddenly go violently insane—no warning, no visible reason—just viciously mad. The only possible hope was to employ the Matrix of Chaos, dangerous as it was. Only the selected few were even trained in its use, and Commander Diana Light was one of them. Fresh out of school, inexperienced, the Institute of the Worlds chose her to combat the deadly syndrome... the fate of the Universe was in her hands!] *Reviews/The Aleph*

SHAW, Bob
ORBITSVILLE
Ace/January/\$1.95
(SF Novel No.10)

After a virtual absence of several years in American publications, Bob Shaw returns with two novels, neither unfortunately eligible for the Hugo, due to prior British appearance. [ORBITSVILLE however has just won third place in the 1976 John W. Campbell Memorial Award, not to be confused with the similarly named award for new writers.] A Galaxy serial in 1974, a Gollancz title the following year, this is a curious novel which utilizes a 'Dyson Sphere' (with all the vast possibilities inherent in the concept) in a manner quite different from Niven's RINGWORLD or Pohl & Williamson's STARCHILD. Vance Garamond is a captain of a ship in the fleet owned by Starflight, a corporation that profits from the need of an overpopulated Earth to find new habitable worlds. Inadvertently responsible for the death of the son of Starflight's megalomaniac director, Elizabeth Lindstrom, he panics in expectation of her vengeful wife, an artificial construction 625,000 times the size of Earth. This incredibly vast locate has size of Earth. This incredibly vast locate has swallowed up refugees and exploiters of every kind from all over the galaxy. Like them, Garamond finds himself becalmed, stuck with his mutinous crew, "like flies in a honeypot", awaiting the eventual inevitable confrontation with Lindstrom.

A WREATH OF STARS
Doubleday/February/\$5.95

Shaw seems to have a thing for optical curiosities, as for example, the device that enabled a blinded man to see in NIGHT WALK and the 'slow glass' of his best-known story, "Light of Other Days." In this novel, published by Gollancz in 1976, glasses have been invented which make it possible to see in the dark. When men wearing these glasses glimpse 'ghosts' deep in an African mine, three dissimilar people are sent to investigate. They learn that there is a world within our world composed of anti-matter, which has been pulled off course by a wandering 'neutrino planet'. It falls to Gil Snook, an uncommitted pilot and soldier-of-fortune to make first contact with the strange inhabitants of this unexpected world before the return of the neutrino planet and the unknown consequences to both worlds that will result.

SMITH, E.E., See GOLDIN, S.

SPRUILL, Stephen G.
KEEPERS OF THE GATE
Doubleday/February/\$5.95

[An alien race, of which very little is known, have descended to open an embassy on Earth. Jared Hiller, an embittered spaceship captain, is involved in an explosion for which he believes the aliens are responsible and parts of his body are replaced bionically. A chance encounter with a previous acquaintance whose missing arm has been regenerated (through a technique not available on Earth) and who appears not to have aged in twenty-five years, gives Hiller a vital lead. Further investigating turns up proof that the aliens have been on Earth a

Drew Whyte

lot longer than anyone has realized and have been quietly and systematically unearthing and destroying evidence of a former and superior race of man. Dodging government agents as well as the aliens, he stows away on one of their ships and journeys to the source, to discover a millennia-old secret affecting the future of both races.] Has a frontispiece by Freff. New Author.

STABLEFORD, Brian M.
CRITICAL THRESHOLD
(Daedalus Series No.2)
Daw/February/\$1.25

[The second adventure of the recontact vessel Daedalus takes the crew on a mission to investigate a lost colony on a world of perfect weather and endless forest where inexplicable terror reigns. Despite the unspecified doubts of the original survey team, the planet Dendra was approved for colonization. Settlers embarked and a hundred and fifty years passed without a further word. Now it is up to Daedalus to find the explanation of the fearful mystery that lies hidden in the biology of the apparently peaceful jungle continent where the colony met disaster.]

SWANN, Thomas Burnett
QUEENS WALK IN THE DUSK
Heritage Press? / \$15.00

Swann completed this final novel shortly before his death. Like the body of his previous work, QUEENS is a retelling of classical mythology—in this case, the story of Aeneas and Dido, the last survivor of Troy and Founder-to-be of Rome and she the Queen of Carthage. Included are four full-color and four black and white plates by noted fantasy illustrator Jeff Jones and a dedication by Jerry Page, a long-time friend of the author. This deluxe edition is numbered and limited to 2000 copies, available only through the publisher and certain specialty dealers.

TIMEITT, Peter Valentine
TWILIGHT OF THE SERPENT
(The Seedbearers Trilogy: Volume 3)
Bantam/February/\$1.50

In THE SEEDBEARERS, the first book in this British chronicle-novel, a chosen few escaped the destruction of Atlantis and made their way to Albion. THE POWER OF THE SERPENT related the violent conflict between the ruling Wessex priests and the new culture of the Druids, inheritors of the secrets of Atlantean mystical magic and superscience. When the priests are defeated, the Druids erect Stonehenge and the lines of power that channel the forces of celestial magnetism. A hundred years later, in the final volume, the cycle is continued. Now the Druids must confront the ultimate threat: the legions of the Roman Empire. Unable to resist, they withdraw to an isolated stronghold to make a final stand. Under the direction of Gilda, the last priestess, the secrets of the culture are purposely destroyed, lest they fall into enemy hands. Then, as happened at Masada, . . . And yet, something is preserved. For legend has it that Jesus came as a child to ancient Britain. Rome is destined to be conquered in her turn. And so, if only on the astral plane, Atlantis lives!

VAN VOGT, A. E.
SUPERMIND

Daw/January/\$1.25

Formerly to have been titled I.Q. 10,000, this is I believe, somehow related to the author's "Asylum" and another successor story. [Research Alpha started out as a team trying to find the meaning of certain mysterious messages from outer space. The fate of humanity depended upon a mission to contact the source, a super-intelligence with a stupendous I.Q., that could span the universes. When the team arrived at Point Omega, it was almost too late! Yet they might still be able to learn the reason for Man's very existence. SUPERMIND is a novel of people in danger, of alien monsters, and also of a potential cosmic Utopia.] (A story called "Research Alpha" appeared in the July, 1965 issue of IF and is credited to both Van Vogt and James H. Schmitz.)

WALLACE, Ian
THE SIGN OF THE MUTE MEDUSA
Popular Library/January/\$1.50

Since we told you in the last appearance of "The Aleph" that the true identity of Ian Wallace was secret, it has been revealed by two sources (Barry McGahan's SCIENCE FICTION AND FANTASY PSEUDONYMS and a publicity release from the publisher of the present book). He is Dr. John Pritchard, now lives in Asheville, North Carolina and is apparently retired from practice. This novel is one of three "Interplanetary Detective Mysteries" featuring an elegant policewoman, Claudine St. Cyr, whose resourcefulness and aplomb command the respect of galactic royalty. The year is 2480. [Welcome to the planet Turquoise where the marvels of technological progress have turned the sea to acid and the air outside the great domed city to poisonous gas—where the affluent, exquisitely civilized ruling class has devised a program of population control that will leave only themselves alive—where a mysterious group of rebels is sufficiently disturbed by all the above to launch a cunning and complex campaign of killing, kidnapping, impersonation, seduction and time-change.]

WARNER, Sylvia Townsend
KINGDOMS OF ELFIN
Viking/March/\$8.95

[C, F]

"The meaning and importance of fairy tales," to quote the subtitle of Bruno Bettelheim's recent study, THE USES OF ENCHANTMENT, have been acknowledged by such literary figures as Coover, Barthelme and Gardner, who have written their own up-to-date versions, for discriminating adults only. Miss Warner's fables are stylish and sophisticated enough to suit the readers of THE NEW YORKER, where they have been appearing over the past few years (as have Barthelme's) but, while not Tolkein, they are also likely to have appeal for connoisseurs of 'orthodox fantasy'. They are quite distinctive in tone, not whimsical but droll witty and charmingly disconcerting, as was her small masterpiece LOLLY WILLOWES (a lonely, lonely spinster who makes a pact with the Devil), chosen as the first selection of the Book-of-the-Month Club fifty years ago. Miss Warner is also the biographer of

Continued on page 95

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Inquisition

Letters

(A bit truncated this time to allow for a slightly oversized, but not to be outdone, Aleph.)

Cicero's head presented to Fulvia, the wife of Antony, against whom Cicero had delivered fourteen of his most critical orations, hence the bodkins piercing the tongue.

Dear Mr. Ryan:

There you go already, "humankind can... mature to the point where it will reach out and conquer the stars", and in your very first editorial, too.

Besides being hackneyed and semantically empty the phrase "conquer the stars" reveals that you really haven't done the ecological homework that any contemporary SF mag. should make basic. Haven't we found that the conquest-of-nature mindset is a disastrous approach to technology? Haven't we yet learned enough about ecology to know that we must work with nature, and the universe, rather than attempting to "conquer" it?

Don't get me wrong... I'm all for exploration and colonization of space and in fact view this as one of humanity's most important (and practical) goals, perhaps its 'salvation', whatever that means. But I don't believe in rape and have no interest in "conquest of the stars". If we're going into it in that frame of mind, let's sit back and think it over one more time.

By the way, anyone interested in promoting realistic attempts to accomplish space colonization in the next few decades would be advised to contact:



L-5 Society, 1620 N. Park Ave., Tucson, AZ 85719 or Starflight Network, Box 317, Berkeley, CA 94701, both of which are in the forefront in this field.

Congratulations on the rest of *Galileo*. ... it looks like it's going to be a first rate magazine.

In Peace,
Ned Wilgus

Dear Mr. Ryan:

I heartily agree with Jeff Smith ('Letters', *Galileo No.1*) when he admonishes you to avoid the repetitious pitfall of publishing only 'Analog-style aerospace articles'. After all, we can always turn to *Analog* for those. However, Mr. Smith's contention that 'biology and psychology are extremely important to our future, and in my magazine I would probably emphasize those' convinces me that I would have little interest in a magazine whose editorial policy is as limited as the purview of Mr. Smith.

Believe me, it would be far better for you to emulate the illustrious name on the cover of your magazine, and by doing this develop as much of a 'ren-

issance' outlook as possible, covering all fields of human endeavor as they apply to science and literature.

Wishing you the best of luck in your worthy and noble venture, I remain

Sincerely yours,
Keith A. Daniels
Renaissance is exactly where we are at. —ed.

Dear *Galileo* folks,

I picked up your first issue and liked what I saw, so enclosed is \$4 for a year's worth.

Two things that I was particularly taken with were: first, your idea of reviewing books before release (but I would like to see a little more depth. All you have now is blurbs. It is possible to do a concise but meaningful review. Spider Robinson does it every month). Secondly, I also liked the author's photo gallery. A fine idea!

The fiction was generally a pass; nothing of Hugo quality, but no out-and-out turkeys, either. It will be interesting to see your magazine develop a personality of its own.

Good luck. We need more good magazines. Five is not enough.

Jud Cole

Aleph cont.—from page 93

T.H. White, one of the masters of modern fantasy. KINGDOMS OF ELFIN is a panorama of a 'secondary universe' [parallel to the mortal world and sometimes touching it, with ruling Queens, Consorts, an aristocracy, even changelings and hosts of Elfin servitors, alive in all their charm, their wariness, even their cruelty.] It may come to be regarded as a classic. Postponed From December.

WHITE, James (C)
MONSTERS AND MEDICS

Ballantine-del Rey/March/\$1.50

At least some of the stories in this new collection of eight stories are sure to feature further episodes in the hectic career of Dr. Conway, of Sector General, the giant Hospital Station described in the book of the same title as well as MAJOR OPERATION and STAR SURGEON. To this orbiting medical citadel come doctors and patients of all species, shapes and sizes from all over the galaxy to heal and be healed in conditions that exactly reproduce the environments of their home worlds.

WHITE, Ted & WOLFMAN, Marvin
THE OZ ENCOUNTER
(Doc Phoenix: Book One)
Pyramid/January/\$1.50
Delayed from December. See issue No. 1
for details.

ZEBROWSKI, George (C)
THE MONADIC UNIVERSE
ACE/March/\$1.50



George Zebrowski is the author of THE OMEGA POINT (chronologically the second in a trilogy, the first and third volumes of which are yet to come, as is his major novel, MACROLIFE). A former editor of the Bulletin of The Science Fiction Writers of America, he is also a prolific anthologist, the editor of Unity Press' Planetary Series (TOMORROW TODAY and the forthcoming BIO-GENESIS) as well as HUMAN-MACHINES (with Thomas N. Scortia) and FASTER THAN LIGHT (with Jack Dann). This is the first collection of his own shorter fiction.

ANTHOLOGIES

BOYER, Ken & ZAHORSKI, Roger (editors)
THE FANTASTIC IMAGINATION (F)
Avon/February/\$1.95
Classic stories of 'adult fantasy'

CARR, Terry (editor)
UNIVERSE 7
Doubleday/January/\$6.95
SF Book Club/March/\$1.98+
Eight original stories

EDELSTEIN, Scott (editor)
FUTURE PASTIMES
Aurora/January/\$6.95
Stories old and new about tomorrow's
recreation (not just sports)

ELWOOD, Roger (editor)
A WORLD NAMED CLEOPATRA
Pyramid/March/\$1.25
Poul Anderson supplies an introductory

essay about the physical details of an alien planet; he and others write set on that world, . . . similar to the 'Twain Trip-let', THE PETRIFIED PLANET and Ian Ellison's forthcoming Medea project.

HALDEMAN, Joe (editor)
**STUDY WAR NO MORE: A
SELECTION OF ALTERNATIVES**
St. Martin's Press/February/\$8.95
Delay possible.

LeGUIN, Ursula K. (editor)
NEBULA AWARD STORIES ELEVEN
Harper & Row/February/\$8.95
(with an introduction by Peter Nicholls of
British SF Foundation)

MARTIN, George R. R. (editor)
**NEW VOICES IN SCIENCE FICTION:
STORIES BY CAMPBELL AWARD
NOMINEES**
Macmillan/February/\$8.95
7 original stories.

OFFUTT, Andrew J. (editor)
SWORDS AGAINST DARKNESS (F)
Zebra/February/\$1.95
New tales of heroic fantasy . . . has a
Frazetta cover.

WILHELM, Kate (editor)
CLARION IV
Berkley/January/\$1.25
New fiction from SF writing workshop
students, with essays by their instructors,
the professionals.

Telescope

Our hyperbolic pipe reveals these protuberant features coming in issue Number Three:

"The photographs depicted three gigantic sea-going creatures each remarkably similar to the next in its functional, streamlined form." *Where the Lines Converge* by Brian Aldiss

"Why, then, is crater Ptolemy so much more prominent on the moon than crater Galileo?" *The Naming of The Solar System* by Carl Sagan

"They came for me in the golden moonlight. On the shattered ground, their bony frames cast weirdly elongated shadows . . ." *Night Callers* by Kevin O'Donnell, Jr.

"The alien scent of her hair was as exciting as any dawn odor even on a planet of perpetual spring." *Adora* by Robert Chilson

"That name of beauty, that name of wrath and Time. Nemo! breaks forth from ice-crusted tongue" *N* by Ray Bradbury

"It's hard to believe that something so beautiful could be so deadly." *Titan Base* A.J. Giambra

and other remarkable stories, articles and reviews. Take a peek . . .

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Bestor Dr., Rockville, MD 20853

JACK MANN: "Nightmare Farm", "Ninth
Life", "Gee's First Case", "The Glass Too
Many", "Grey Shapes", Cloth Reprints, \$5.
per title. Bookfinger, Box 487, Peter Stuy-
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